

Interdisciplinary and Cross Year Course Mentoring and Integration

Chris Short, Nicholas Pickett and David Ian Legge (external mentor)

e-mail c.short@shu.ac.uk n.j.pickett@shu.ac.uk david_ian_legge@yahoo.co.uk



Summary

The work being undertaken aims to create opportunities for enhancing students' learning experiences by developing links between design / mechanical engineering final year projects and taught classes in other engineering disciplines. Students' project management skills, as a framework for developing autonomy, are also in focus with the long term aim of developing a project management framework and toolbox applicable in many of the course modules taken by engineering undergraduates.

Introduction

Final year engineering projects are often narrow in scope and sit firmly within students "what I can achieve on my own" comfort zone. Whilst such projects can be challenging, they do not prepare students for real world engineering where multidisciplinary projects are commonplace. However, it is unfair to expect students to define and participate in interdisciplinary projects if they are not exposed to this way of thinking and working during their formative foundation years. This project aims to address these issues...

Aims of the Project

- To inspire students and staff by using an interdisciplinary approach to enable broader scope and greater depth in undergraduate projects and applied coursework.
- To help students better understand their development towards becoming professional engineers capable of working autonomously in multidisciplinary projects.

These aims will be achieved by providing 1st and 2nd year students with structured contact with final year students over course and subject boundaries.

The Project so Far

- ⇒ Broad project themes with potential for significant interdisciplinary elements developed by staff.
- ⇒ Interested final year students define the scope and aims for *their* project through the use of an in-depth 'pre-study' completed within the first few weeks of the project.
- ⇒ Project defined formally (ACES requirement) and also presented informally in an A4 'flier' outlining scope and interdisciplinary elements.
- ⇒ Weekly reporting of progress against a simple checklist
 - What has been achieved this week?
 - What has not been achieved, and why?
 - What is planned for the coming week?
- ⇒ Areas for contact between final year and lower year students defined.

Problems Encountered

Final year students (and ACES staff) seldom work within an interdisciplinary framework which has led to difficulty appreciating and defining how other disciplines can enhance the projects.

Hence...

Staff in complementary subject areas (eg. Control and Electronics), whilst keen to participate, are unsure of what support is needed.

Solution?

Round-table discussions involving student, project supervisors and staff from complementary subject areas is suggested.

Future Plans

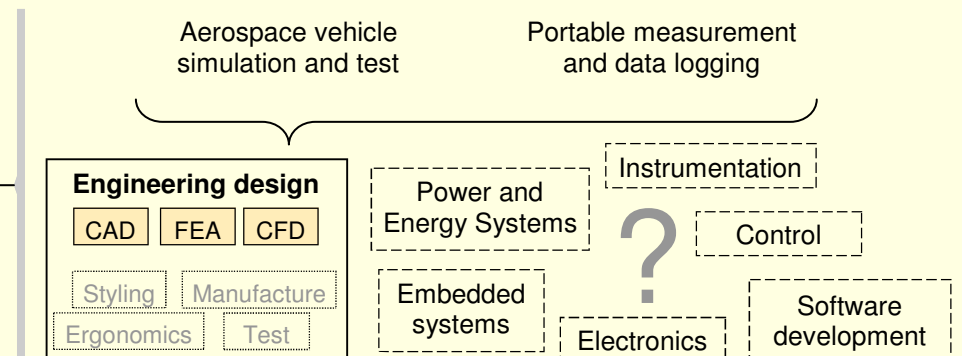
Formal project management structure and tools used to be documented and their use in other course modules encouraged.

Raise the status and value of final year projects by:

- ⇒ Presenting completed final year projects to other students and other interested parties and stakeholders eg through a 'Final Year Project Day.'
- ⇒ Providing opportunity for early (pre-summer) definition of final year projects and offering brokering between projects with interdisciplinary content.

Final Year Project Themes

Broad themes, encouraging multi-disciplinary thinking, were defined to help engineering design students "think outside of the box" as far as the scope of their projects was concerned.



Final Year Projects

- Design of a static hover UAV
- Design of a release mechanism for a UAV
- Design of a drop rig for a glider impact tests
- Development of a glider motion platform simulator
- Force feedback joystick design
- Manual scanning rig for a glider / large objects

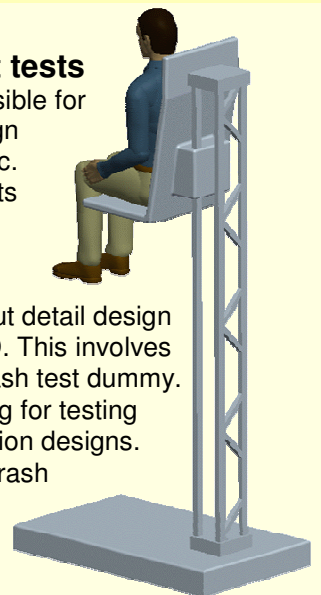
Example Project:

Design of a drop rig for glider impact tests

Final year student leads the project and is responsible for background research, design study, concept design and evaluation, allocation of detail design tasks etc. The design must take account of user requirements and related teaching activities.

Interdisciplinary elements

- 1st year engineering design students carrying out detail design on the rig as part of a foundation course in CAD. This involves understanding of ergonomics aspects of the crash test dummy.
- 1st and 2nd year aerospace students using the rig for testing undercarriage, seat and energy absorbing cushion designs.
- Automotive and Aerospace courses using the crash test dummy on the rig to measure, forces, accelerations, pressures etc.



Project Student Comments

"It feels like we are so much further on than other students that we have contact with."

"Even if you get stuck, you know you have support on hand."

"Having a number of aerospace themed projects running concurrently has really helped us by allowing ability to share ideas and build on each others work."

"The weekly progress meetings and update reports have helped us critically evaluate our own progress. We feel we are letting staff down if we don't deliver."

