DESIGN AND COMPUTING

The Design element

Richard Martin	- CAD
	- Design Principles
	- Detail Design & Manufacture
Eric Kim	- Design Principles
Tom Rendall	- Flight Design Project
Brano Titurus	- Flight Design Project
Ben Woods	- Flight Design Project

Aims & Objectives

- AIM:

  The Design element of the Unit is intended to introduce students to the principles and processes used in design with specific reference to aerospace vehicles.

- OBJECTIVES:

  Upon successful completion the student will be able to:

  - appreciate the role of geometry construction in various design cycles
  - interpret and present graphical information, in sketch, orthographic and isometric drawing formats
  - create 3D solid object models and engineering drawings using CAD
  - demonstrate knowledge of basic design principles and manufacturing processes
  - apply design tools and understanding from the D&C unit along with basic Aerodynamics, Dynamics & Structures from other units to:
    - design a model flight vehicle;
    - manufacture, test and measure the performance of the flight vehicle;
    - produce documentation to clearly define the design and explain the performance.

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Contents

The Design Section of the D&C unit comprises:

- Detail Design & Manufacture
- Computer Aided Design (in the Computing Section* on Blackboard)
- Design Principles
- Flight Design Project

(* The Computing Section also includes Programming – delivered by Daniel Poole)

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Detail Design & Manufacture

The “DD&M” element introduces:

- Engineering Drawing Basics
  - Communication
  - Accuracy
  - Control
- Orthographic and Isometric Projection of objects
  - Drawing Construction
- Dimensioning and Tolerances
- Annotation, Symbols and Standards
- Manufacturing Processes
- Assignments

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Computer Aided Design

The “CAD” element is included in the Computing Section and is based on:

- Autodesk Inventor
  - Feature based 3D modelling
  - Models derived from simple 2D sketches
  - Sketch and Model editing
  - Easy generation of drawings
  - Parametric modelling
  - Associative drawings
  - Assembly modelling
  - Animation of mechanisms

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Design Principles

The “DPr” element provides an initial introduction to the principles of design, manufacture and good design practice in general.

It will include:

- CAD and documentation;
- a Design for Manufacture case study;
- advanced design methodology;
- manufacturing techniques;
- patents
- units of measure;
- A TEST! (but you are allowed a “crib sheet”)

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Flight Design Project

The “FDP” project consolidates the work on the D&C unit, bringing together aerodynamic, dynamic and structural analysis from other units within a flight vehicle design context which makes use of the design and computing capabilities gained from the D&C unit.

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