

## Engineering Tripos Part IA, Engineering Drawing, 2021-22

### Lecturer

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### Timing and Structure

The course is introduced by a lecture. Five self-paced workbooks must be completed. These are assessed in two scheduled mark up sessions. Helpdesk support is available prior to the scheduled mark up sessions.

### Aims

The aims of the course are to:

- demonstrate the role of engineering drawing in design and communication
- develop skills in reading different types of engineering drawings
- develop skills in producing different types of engineering drawings.

### Objectives

As specific objectives, by the end of the course students should be able to:

- read and produce orthographic projection drawings (with the correct arrangement of principal views)
- distinguish first-angle drawings from third-angle drawings
- read isometric drawings of simple and complex shapes
- sketch simple shapes in isometric and combine them to generate more complex shapes
- convert between isometric and orthographic drawings (drawing one based on the other)
- read and produce auxiliary views (on orthographic projection drawings)
- construct basic sequences of auxiliary views (projecting new views from the preceding views)
- read and produce hidden detail on isometric and orthographic drawings
- read and produce sectioning on isometric and orthographic drawings
- construct isometric sketches from successive sections
- read and produce isometric and orthographic drawings with basic dimensions
- identify and correct over-dimensioning or under-dimensioning on drawings
- read and produce drawings which account for the effects of simple dimensional variation.

### Content

The course is divided into five topics, each delivered through a workbook. Each workbook provides explanations, examples and exercises, arranged into sub-topics.

#### 1. Orthographic projection

1.1. The different kinds of drawing used on the course

1.2. Different types of lines and what they represent

- 1.3. How orthographic projections are constructed
- 1.4. The main two conventions for how orthographic projections are laid out
- 1.5. The principal views which are often drawn in orthographic projections
- 1.6. The reason that 2nd and 4th angle projections aren't used (an appendix).

## **2. Isometric drawing**

- 2.1. What isometric views are
- 2.2. How to sketch basic shapes
- 2.3. How to sketch circles, cylinders and spheres
- 2.4. How to represent locations, movements and forces
- 2.5. How to draw dimetric and trimetric views.

## **3. Auxiliary views**

- 3.1. Identifying significant views of planes and lines
- 3.2. Projecting auxiliary views from principal views
- 3.3. Methods for constructing auxiliary views
- 3.4. Projecting partial auxiliary views
- 3.5. Significant views of forces and moments
- 3.6. Considering isometric projections as auxiliary views (an appendix).

## **4. Sectioning**

- 4.1. The presentation of hidden detail
- 4.2. The presentation of section views
- 4.3. Special rules for offset, partial, revolved, removed and successive sections
- 4.4. Combining auxiliary views with section views to yield auxiliary sections
- 4.5. Drawing sections in isometric views
- 4.6. Special rules for sectioning thin material (an appendix).

## **5. Dimensioning**

- 5.1. Presenting measurements on drawings

5.2. Some principles of dimensioning

5.3. Problems with over-dimensioning and under-dimensioning

5.4. Accounting for dimensional variation

### Further notes

There is a [moodle](#) [2] page supporting the course.

### Booklists

Please refer to the Booklist for Part IA Courses for references to this module, this can be found on the associated Moodle course.

### Examination Guidelines

Please refer to [Form & conduct of the examinations](#) [3].

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### Links

[1] <mailto:nc266@cam.ac.uk>

[2] <https://www.vle.cam.ac.uk/course/view.php?id=202401>

[3] <https://teaching21-22.eng.cam.ac.uk/content/form-conduct-examinations>