Engineering Tripos Part IA, Engineering Drawing, 2024-25

Lecturer

Prof. Nathan Crilly [1]

Timing and Structure

The course is introduced by a lecture (this will be recorded). 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

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 [2].

UK-SPEC

This syllabus contributes to the following areas of the UK-SPEC [3] standard:

Toggle display of UK-SPEC areas.

General transferable skills

Intellectual Abilities

Knowledge and Understanding

Practical skills

Design (D)

Design is the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems.

Engineering Practice (P)

Practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This must include an appropriate combination of the majority of these outcomes.

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Links
[1] mailto:nc266@cam.ac.uk
[2] https://teaching24-25.eng.cam.ac.uk/content/form-conduct-examinations
[3] https://teaching24-25.eng.cam.ac.uk/content/uk-spec