1E9 ENGINEERING DESIGN I: GRAPHICS AND COMPUTER AIDED ENGINEERING [5 credits]

Lecturer(s): Assistant Prof. Bidisha Ghosh (bghosh@tcd.ie)

Module organisation
The module runs for the second half (12 weeks) of the academic year and comprises of one lecture and one three-hour laboratory per week.

Module description, aims and contribution to programme
This module is designed to teach students the tools and techniques of engineering drawing and to enable them to communicate using the language of engineering graphics.

The objectives are as follows:
- to create engineering drawings of 3D objects using projection techniques by hand or CAD software
- to appreciate the role of aesthetics and creativity in engineering design
- to critically analyse an engineering design through reverse engineering

Learning outcomes
Upon completion of this module, students will be able:
1. To create, develop and draw two-dimensional images of objects by using projections using both hand-drawing & CAD software;
2. To identify and interpret dimensioned, two-dimensional representations of objects;
3. To communicate a design idea using visualisation tools.

Module content
- Appreciation of aesthetics & creativity in engineering design
- Multi-view Projection
- Isometric Projection
- Dimensioning
- Reverse Engineering & Assembly
- Analysis of a chosen design object

Teaching strategies
This module is taught using a combination of lectures, laboratories, individual and group assignments.

Associated laboratory/project programme
Drawing Laboratories: 8 x 3 hour laboratories
CAD Laboratories: 3 x 3 hour laboratories
Assessment
This module is assessed as follows:
- Examination: 60% (formal written two-hour end-of-year examination)
  Students are required to achieve a minimum 30% in the examination to pass this module.
- Engineering Design Assignment: 40%

References
Technical Draughtsmanship, Éanna O Broin, Gill and Macmillan (Ireland), 1986
Technical Drawing 1: Plane and solid geometry, A Bankole and S Bland (England), 1991
100 CAD Exercises - Learn by Practicing!
By Jason Artes

DRAWING EQUIPMENT
Each student must have the following drawing equipment for the drawing exercises:
- Pencils: either woodcase or clutch pencils with each of the following leads: HB, H, 2H;
- Eraser: Must be a good quality one e.g. Staedtler 52650;
- Set squares: 21cm size - one 45 degree and one 30/60 degree (or and adjustable set square) e.g. Stadedtler 56721-60 and 56721-45 or Rotring 812321 and 813321;
- Compass(es) - Staedler Mars 55202SK, Faber 174925 Ultra P, Rotring R530116;
- Protractor: e.g. Rotring circular 821425;
- A3 Tee squares;
- Scale: flat or triangular including the scales - 1:1, 1:5;
- Curves: French curves;
- Vernier Callipers
- A3 Folder for drawing sheets

IMPORTANT NOTES
- Keep to the deadlines given in class. Late submissions for assignments will not be accepted unless a medical certificate accompanies them.
- The brand names and item numbers given above are only guidelines to indicate recommended quality and size.
- Drawing paper is supplied by the Engineering School Office for Drawing Office sessions only.

Further information