

BENT106 Exploring and Using Engineering Tools, Instruments and Materials

ECTS Value: 5 ECTS
Self-Study Hours: 60

Contact Hours: 25
Assessment Hours: 40

Overall Objectives and Outcomes

This unit is intended to provide knowledge and practical skills required to produce engineering components with common level of technology normally available at secondary school workshops. This unit reviews a range of tools and materials which are fundamental in the industry of engineering. At the same time, this unit also include and challenge learners to explore the latest planning and production techniques and technologies being used to develop engineering components.

By the end of this module, the learner will be able to:

Competences

- a. develop a critical approach evaluate the level of accuracy of a range of making tools and measuring instruments;
- b. associate setting out, marking and cutting operations to primary datum to produce an engineering component from sheet metal or steel profiles;
- c. engage with literature on current developments on single point cutting tools;
- d. develop a critical understanding of typical joint configuration, edge preparation and the most advantageous weld position during production that could be adopted to ensure quality;
- e. critically evaluate jointing processes used on a typical engineering component against product design for cheap production and against the maintenance and repair requirements when in use to re-use;
- f. develop an understanding of a good workshop layout.

Knowledge

- a. communicate how the following precision instruments are designed and used: micrometre, veneer callipers, veneer depth gauges, veneer height gauges, slip gauges;
- b. explain the use of weld joints, typical joint configuration, edge preparation and weld positions for a range of situations;
- c. explain the characteristics of different twist drills such as, twits drills for steel and aluminium, masonry carbide twist drills;
- d. explain the main characteristics of fasteners such as: Bolts and nuts, screws, self-taping screws, rivets, pop-rivets etc.;
- e. determine the hazards that could result from poor workshop layouts especially when the workshop is being used by more than one person.

Skills

- a. employ a range of twist drills holding methods/ devices;
- b. use appropriate finish product sequence to diverse products;
- c. apply a range of “temporary, semi-permanent and permanent” type of fastening as used on engineering products;
- d. draw the design and the manufacturing concepts commonly-followed to engineer a product;
- e. demonstrate and evaluate a range of sheet metal work operations and the common tools that can be used to perform them.

Assessment Methods

This module will be assessed through: Project (70%), Research assignment (30%).

Suggested Readings

Core Reading List:

1. Felix, I.W., (2017). Fundamentals of Workshop Technology: for engineering students. Amazon Digital Services LLC
2. Weiss, A. (2017). Workshop Machinery (Workshop Practice Series). US: Trans-Atlantic Publications.
3. Weiss, A. (1999). Workshop Materials. (Workshop Practice Series). US: Trans-Atlantic Publications.
4. Barr, E. (2013). Professional Sheet Metal Fabrication (Motorbooks Workshop). Motorbooks.
5. Jeffus, L. (2011). Welding and Metal Fabrication. Delmar Cengage Learning.