Changing lives through learning

Access to Higher Education Unit

This unit forms part of an Access to HE Diploma. If delivering the graded version of this unit, please refer to the Provider Handbook for details on grading descriptors and the application of these across units within your programme.

Unit Title: Introductory Computer Aided Design (CAD) for Engineering

Graded Unit Reference Number: GA33MTH36

Ungraded Unit Reference Number: UA33MTH36

Module: Maths

Level: Three [3]

Credit Value: Three [3]

Minimum Guided Learning Hours: 30

Learning Outcome (The Learner will):		Assessment Criterion (The Learner can):	
1.	Read, interpret and produce engineering drawings following industry practices	1.1	Interpret engineering drawings identifying line types, scales, dimensions and views.
		1.2	Produce an engineering drawing following industry conventions.
2.	Use a professional 3D parametric CAD package to produce a multi-part assembly	2.1	Produce accurate models using a range of tools.
		2.2	Produce an engineering drawing in a CAD system of previously modelled parts.

Indicative Content Learners could cover the following: (The information below is provided for guidance only and is not mandatory)	
LO1	AC1.1 **Interpret engineering drawings identifying line types, scales, dimensions and views** **Purpose of engineering drawings as a communication tool** **Awareness of industry standards (BS8888, ISO norms)** **Line types and meanings:** • Continuous/thick lines

	• Hidden lines • Centre lines • Cutting plane lines • Section lines **Types of views:** • Orthographic projection • First-angle vs third-angle projection • Isometric views • Exploded views (introductory awareness) **Drawing scales:** • Common engineering scales (1:1, 1:2, 2:1 etc.) • Choosing appropriate scale for clarity **Title blocks, borders, revision tables** **Dimensions:** • Linear and angular dimensions • Dimension placement and conventions (aligned/unidirectional) • Basic tolerancing and fit types (introductory) **Interpretation of standard symbols (surface finish, threads, datums – awareness level)** AC1.2 **Produce an engineering drawing following industry conventions** **Setting up a drawing sheet in line with standards** **Creating orthographic views from a model or manually** **Adding dimensions, notes, hole callouts** **Applying the correct line types and weights** **Use of section views to show internal features** **Producing isometric/auxiliary views for clarity** **Completing title blocks and revision fields** **Selecting correct scale for detail visibility** **Checking drawings for:** • Accuracy • Legibility • Compliance with conventions • **Exporting drawings (PDF, DWG) for submission or manufacture**
LO2	AC2.1 **Produce accurate models using a range of tools** **Introduction to parametric CAD principles**

Interface navigation and file types (parts, assemblies, drawings)

Sketch creation:

- Sketch entities (lines, arcs, circles, polygons)
- Geometric constraints (parallel, tangent, concentric etc.)
- Dimensional constraints (fully defining sketches)

Feature-based modelling tools:

- Extrude (boss/cut)
- Revolve
- Sweep
- Loft
- Shell
- Fillet and chamfer
- Patterns (linear, circular, mirror)

Hole creation using hole wizard/tools

Editing models and design intent

Managing model history/feature tree

Good modelling practice:

- Naming conventions
- Clean sketches
- Feature order and robustness

AC2.2

Produce an engineering drawing in a CAD system of previously modelled parts

Generating drawing sheets from CAD parts/assemblies

Applying standard drawing templates

Creating:

- Orthographic projections
- Isometric views
- Section views
- Detail views

Automatic dimensioning tools and manual dimension placement

Adding annotation:

- Hole callouts
- Notes
- Centre marks
- GD&T (basic awareness)

Producing a Bill of Materials (BOM) where appropriate

Updating drawings following model changes (parametric linking)

Exporting to required formats (PDF, DWG, DXF)
