	4. 3During Industrial attachment
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PREPARE AND INTERPRET TECHNICAL DRAWINGS

UNIT CODE: ENG/OS/QS/CC/02/6/A

UNIT DESCRIPTION

This unit covers the competencies required to prepare and interpret technical drawings by a Quantity Surveyor. It involves competencies to select, use and maintain drawing equipment and materials. It also involves producing plain geometry drawings, solid geometry drawings, pictorial and orthographic drawings of components and application of CAD softwares.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes that make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Use and maintain drawing equipment and materials	1.1 ***Drawing equipment*** are obtained according to task requirements 1.2 ***Drawing materials*** are obtained according to task requirements 1.3 Drawing equipment are used and maintained according to manufacturer instructions 1.4 Drawing materials are used according to task requirements 1.5 Waste materials are disposed in accordance with workplace procedures and ***environmental legislations*** 1.6 ***Personal Protective Equipment*** is used according to occupational safety and health regulations

2. Produce plain geometry drawings	2.1 Lettering and line work is done according to drawing rules 2.2 Sketches of ***geometric forms*** are interpreted according to standard conventions 2.3 Different types of angles are constructed according to principles of trigonometry 2.4 Different types of geometric forms are constructed according to standard drawing conventions 2.5 Constructed geometric forms are dimensioned according to drawing requirements
3. Produce solid geometry drawings	3.1 ***Sketches of patterns*** e.g. are interpreted according to work requirements 3.2 Interpenetrating surface of solids and truncated solids are developed according to work requirements 3.3 ***Interpenetrations of solids*** of equal and unequal is done according to work requirements
4. Produce pictorial and orthographic drawings of components	4.1 Different symbols and abbreviations are identified and their meaning interpreted according to standard drawing conventions 4.2 Isometric sketches and drawings of components are interpreted and produced in accordance with the standard conventions of isometric drawings 4.3 First and third angle orthographic sketches and drawings of components are produced in accordance with the standard conventions of orthographic drawings 4.4 Freehand sketching of different types of geometric forms, tools, equipment, diagrams and components is conducted
5. Produce assembly drawings	5.1 Orthographic views are exploded according to standard conventions of orthographic drawings. 5.2 Pictorial views are exploded according to standard conventions of orthographic drawings. 5.3 Part lists are identified according to drawing specifications 5.4 Sectional views are produced according to standard conventions of drawing. 5.5 Produced drawing is hatched according to standard conventions of drawings.

6. Apply CAD in technical drawing	6.1 ***CAD software*** are identified according to work requirements 6.2 2-D models are produced according to work requirements 6.3 3D models are produced according to work requirements 6.4 Produced models are annotated according to work requirements

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	**Range**
Drawing equipment may include but is not limited to:	• Drawing boards • T-square • Set squares • Drawing set • French curves • Computers
Drawing materials may include but is not limited to:	• Drawing papers • Pencils • Erasers • Masking tapes • Paper clips
CAD software may include but is not limited to:	• AutoCAD • Inventor • Solid Works • Archi CAD • Electronic work bench • Circuit maker • Proteus
Sketches of patterns may include but is not limited to:	• Cylinders • Prisms • Pyramids

Interpenetrations of solids may include but is not limited to:	• Cylinder to cylinder • Cylinder to prism • Prism to prism
Environmental legislations may include but is not limited to:	• EMCA 1999 • NEMA Regulations
Personal Protective Equipment may include but is not limited to:	• Dust coats • Closed leather shoes • Goggles for CAD
Geometric forms may include but is not limited to:	• Circles • Triangles • Rectangles • Parallelogram • Polygons • Pyramids • Conic sections • Prisms • Loci
Standard drawing conventions may include but is not limited to:	• Anatomy of engineering drawing (title block, coordinate grid system, revision block, notes and legends) • Drawing scale (paper size and drawing symbols) • International drawing standards

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required skills

The individual needs to demonstrate the following skills:

- Critical thinking
- Drawing
- Interpretation
- Drawing equipment handling
- Analysis and synthesis
- Communication
- Inter personal relations
- Computer

Required knowledge

The individual needs to demonstrate knowledge of:

- Drawing equipment and materials
- Freehand sketching
- Lettering
- Geometrical constructions
- Types of drawings
- Types of lines
- Engineering calculations
- Isometric drawing conventions, features, characteristics, components
- Orthographic drawing conventions, features, characteristics, components
- Sketches and drawings of simple patterns

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied and adhered to safety procedures 1.2 Cared and maintained drawing equipment 1.3 Interpreted circuit, assembly and lay out diagrams 1.4 Applied appropriate technical standards, used proper tools and equipment for a given task 1.5 Produced sketches and drawings 1.6 Applied CAD in production of drawings
2. Resource Implications	Resources the same as that of workplace are advised to be applied. 2.1 Drawing room 2.2 Drawing equipment and materials 2.3 Computers 2.4 CAD software 2.5 PPE 2.6 Internet
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report

4. Context of Assessment	Competency may be assessed: 4. 1On-the-job 4. 2Off-the –job 4. 3During Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.