COMPETENCY STANDARDS & ASSESSMENT GUIDE
FOR
CIVIL AUTO CAD (2D & 3D)

Skills for Employment Investment Program (SEIP)
Finance Division, Ministry of Finance

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INTRODUCTION:

The Skills for Employment Investment Program (SEIP) Project of the Finance Division of the Ministry of Finance has embarked on a project which aims to qualitatively and quantitatively expand the skilling capacity of identified public and private training providers by establishing and operationalizing a responsive skill eco system and delivery mechanism through a combination of well-defined set of funding triggers and targeted capacity support.

Among the many components of the project, one is to promote a Market Responsive Inclusive Skills Training Delivery program. Key priority economic growth sectors identified by government have been targeted by the project to improve current job skills along with up-skilling of the existing workforce to ensure 'required skills to industry standards'. Training providers are encouraged and supported to work with the industry to address identified skills to enable industry growth and increased employment through the provision of market responsive inclusive skills training programs. Priority sectors were identified to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISCs), Employer Associations and Employers.

This document is developed to improve skills in accordance with the job roles andskill sets of the occupationand ensure that the required skills are aligned to industry requirements.

The document details the format, sequencing, wording and layout of the Competency Standard for an occupation which comprised Units of Competence and its corresponding Elements.

OVERVIEW:

A **Competency Standard** is a written specification of the knowledge, skills and attitudes required for the performance of a job or occupation or trade corresponding to the standard of performance required in the workplace.

Competency standard:

- provides a consistent and reliable set of components for training, recognizing and assessing people's skills, and may also have optional support materials.
- enables industry recognized qualifications to be awarded through direct assessment of workplace competencies
- encourages the development and delivery of flexible training which suits individual and industry requirements
- encourages learning and assessment in a work-related environment which leads to verifiable workplace outcomes.

Competency Standards are developed by a working group who comprised national and international process experts and the participation of experts from the industry to identify the competencies required of an occupation in a particularsector.

Competency Standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. Competency Standards acknowledge that people can achieve vocational and technical competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.

With Competency Standards, training and assessment may be conducted at the workplaceorat training organization or any combination of these.

A Unit of Competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of Competency are documented in a standard format that comprises:

- Reference to Industry Sector, Occupational Title and Occupational Description
- Unit code
- Unit title
- Unit descriptor
- Unit of Competency
- Elements and performance criteria
- Variables and range statement
- Evidence guides

Together all the parts of a Unit of Competency:

- Describe a work activity
- Guide the assessor in determining whether the candidate is competent.

Identification and validation of units of competency and elements for each occupation were made by expertsof various construction companies in an industry consultative workshop held at the Bangladesh Association of Construction Industry (BACI) on the 14th of February 2016.

Profile of experts and facilitators who participated in the Competency Verification and Validation Workshop are given below:

Competency Verification-Validation Experts:

Name	Company	Job Position
Md. Abdul Mannan	Bangladesh-German Technical Training Center	Instructor (Auto Cad)
Jannati Sultana	Royal CNC Training Institute	Architect
Engr. Faridul Islam	Montage Training Center	Instructor
Engr. Md. Alauddin Khelze	MAWTS, Pallabi Mirpur	Chief Instructor
Mr. Moniruzzaman Sani	Montage Training Center	Master Aluminum Fabricator/Installer
Md. Rakibul Hassan	MAWTS, Pallbi, Mirpur	Asst. Instructor

Workshop Facilitators:

Md Ahasan Habib	SEIP	TVET Specialist
Md. Mohiuzzaman	SEIP	Course Specialist
Emeterio Cedillo, Jr.	SEIP	International Specialist
Md. Nuruzzaman	SEIP	National Specialist

The ensuing sections of this document comprise a description of the respective occupation with all the key components of a Unit of Competency:

- A chart with an overview of all Units of Competency for the respective occupation including the Unit Codes and the Unit of Competency titles and corresponding Elements.

- The Competency Standards that include the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

COMPETENCY PROFILE/MAP FOR
CIVIL AUTO CAD (2D & 3D) OPERATION

UNITS OF COMPETENCY	ELEMENTS			
A. Generic (Basic) Competencies				
PERFORM COMPUTATIONS USING BASIC MATHEMATICAL CONCEPTS (SEIP-CON-ACD-1-G)	Identify calculation requirements in the workplace.	Select appropriate mathematical methods/concepts for the calculation	Use tool/instrument to perform calculation	
APPLY OCCUPATIONAL HEALTH AND SAFETY (OH&S) PRACTICES IN THE WORKPLACE (SEIP-CON-ACD-2-G)	Identify OHS policies and procedures	Apply personal health and safety practices	Report hazards and risks	Respond to emergencies
COMMUNICATE IN ENGLISH IN THE WORKPLACE (SEIP-CON-ACD-3-G)	Read and understand workplace documents in English	Write simple workplace written communications in English.	Listen and comprehend to Englishconversation	Perform conversations in English
OPERATE IN A SELF-DIRECTED TEAM. (SEIP-CON-ACD-4-G)	Identify team goals and processes.	Communicate and cooperate with team members.	Work as a team member	Solve problems as a team member
B. Sector Specific (Common) Competencies				
TRANSLATE DRAWINGS, PLANS AND SPECIFICATIONS (SEIP-CON-ACD-1-S)	Carry out basic engineering drawings applied in construction	Access information from manuals, designs and plans	Interpret drawings and specifications from manuals, designs and plans	Store manuals, designs and plans
CARRY OUT MEASUREMENTS AND CALCULATIONS (SEIP-CON-ACD-3-S)	Check usability of measuring devices	Carry out accurate construction work measurements	Execute simple construction work calculations	Clean and maintain measuring instruments
OPERATE A COMPUTER (SEIP-CON-ACD-4-S)	Start and shut down the computer	Access basic system information	Work with files, folders and user application programs	Print documents

C. Occupation Specific (Core) Competencies

PERFORM AUTO CAD 2D FUNDAMENTALS (SEIP-CON-ACD-1-O)	Control display in drawings	Create basic drawings	Manipulate objects as desired	
CREATE 3D INTERFACE/DRAWINGS (SEIP-CON-ACD-2-O)	Develop familiarity with 3D basics interface in AutoCAD	Introduce thickness and elevation	Visualize the model	Draw coordinates
DRAW 3D ORBIT, NAVIGATIONS AND MODEL (SEIP-CON-ACD-3-O)	Develop familiarity with 3D Orbit	Perform 3D dimensional navigation	Operate 3D Object	
PRODUCE 2D SOLID AND 3D FACES (SEIP-CON-ACD-4-O)	Draw 2D Solids and 3D Faces	Draw Edges		
INSERT SURFACES (SEIP-CON-ACD-5-O)	Draw basic 3D surface	Create complex 3D surfaces		
DEVELOP SOLID IMAGES (SEIP-CON-ACD-6-O)	Create images	Edit 3D Objects	Develop 3D Solid composites	Perform solid image modification
MERGE FLAT OBJECTS FROM 3D MODEL (SEIP-CON-ACD-7-O)	Navigate sectioned objects	Merge flat objects		
CUSTOMIZE RENDERING, MATERIALS AND LIGHTS (SEIP-CON-ACD-8-O)	Execute rendering	Apply/configure materials	Apply lights	

Unit of Competencies at a Glance:

Generic (Basic) Competencies (46 hrs.)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SEIP-CON-ACD-1-G	Perform Computations Using Basic Mathematical Concepts	1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods/concepts for the calculation 3. Use tool/instrument to perform calculation	14
SEIP-CON-ACD-2-G	Apply Occupational Health and Safety (OHS) Practice at Workplace.	1. Identify OHS policies and procedures 2. Apply personal health and safety practices 3. Report hazards and risks 4. Respond to emergencies	10
SEIP-CON-ACD-3-G	Communicate in English in the workplace	1. Read and understand workplace documents in English 2. Write simple workplace communications in English 3. Listen and comprehend to English conversations 4. Perform conversations in English language	14
SEIP-CON-ACD-4-G	Operate In a Self-Directed Team	1. Identify team goals and work processes 2. Communicate and cooperate with team members. 3. Work as a team member. 4. Solve problems as a team member	8
Total Hour			46

Sector Specific (Common) Competencies (34 hrs.)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SEIP-CON-ACD-1-S	Translate drawings, plans and specifications	1.Carry out basic engineering drawings applied in construction 2.Access information from manuals, designs and plans 3.Interpret drawings and specifications from manuals, designs and plans	10

		4.Store manuals, designs and plans	
SEIP-CON-ACD-2-S	Carry out measurements and calculations	1.Check usability of measuring devices 2.Carry out accurate construction work measurements 3.Execute simple construction work calculations 4.Clean and maintain measuring instruments	10
SEIP-CON-ACD-3-S	Operate a computer	1.Start and shut down the computer 2. Access basic system information 3.Work with files, folders and user application programs 4.Print documents	14
Total Hours			**34**

Occupation Specific (Core) Competencies (280 hrs.)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SEIP-CON-ACD-1-O	Perform Auto CAD 2d fundamentals	1. Control display in drawings 2. Create basic drawings 3. Manipulate objects as desired	30
SEIP-CON-ACD-2-O	Create 3d interface/drawings	1.Develop familiarity with 3D basics interface in AutoCAD 2.Introduce thickness and elevation 3.Visualize the model 4.Draw coordinates	48
SEIP-CON-ACD-3-O	Draw 3d orbit, navigations and model	1.Develop familiarity with 3D Orbit 2.Perform 3D dimensional navigation 3.Operate 3D Object	34
SEIP-CON-ACD-4-O	Produce 2d solid and 3d faces	1. Draw 2D Solids and 3D Faces 2. Draw edges	34
SEIP-CON-ACD-5-O	Insert surfaces	1. Draw basic 3D surface 2. Create complex 3D surfaces	34
SEIP-CON-ACD-6-O	Develop solid images	1. Create images 2. Edit 3D Objects 3. Develop 3D Solid composites 4. Perform solid image modification	34

SEIP-CON-ACD-7-O	Merge Flat Objects from 3D Model	1. Navigate sectioned objects 2. Merge flat objects	34
SEIP-CON-ACD-8-O	Customize Rendering, Materials and Lights	1. Execute rendering 2. Apply/configure materials 3. Apply lights	32
Total Hours			**280**

COMPETENCY STANDARD:CIVIL AUTO CAD (2D & 3D) OPERATION

A. The Generic (Basic Competencies)

Unit of Competency: **PERFORM COMPUTATIONS USING BASIC MATHEMATICAL CONCEPTS**	**Nominal Duration:** 14 hrs.	**Unit Code:** SEIP-CON-ACD-1-G
Unit Descriptor: This unit of competency requires the knowledge, skills and attitude to perform computations using basic mathematical concepts in the workplace. It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical method/concept for the calculation and using appropriate instruments tools to carry out calculation.		

Elements and Performance Criteria:
(Terms in the performance criteria that are written in**bold and underlined**are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Identify calculation requirements in the workplace	1.1 **Calculation requirements** are identified from **workplace information.**
2. Select appropriate mathematical methods/concepts for the calculation.	2.1 **Appropriate method** is selected to carry out the calculation requirements.
3. Use tool/instrument to perform calculations	3.1 Calculations are completed using appropriate **tools and instruments.**

Range of variables:

Variable	Range May include but not limited to:
2. Calculation requirements.	1.1 Area 1.2 Height 1.3 Length/Breadth/thickness 1.4 Diameter 1.5 Weight 1.6 Capacity 1.7 Time 1.8 Temperature. 1.9 Material usage 1.10 Speed 1.11 Costing 1.12 Mass 1.13 Density
3. Workplace information	2.1 Mechanical Plan 2.2 Design 2.3 Working drawing

	2.4 Verbal instructions 2.5 Job order
4. Appropriate method	3.1 Addition 3.2 Subtraction 3.3 Division 3.4 Multiplication 3.5 Conversion 3.6 Percentage and ratio calculation 3.7 Simple equation
5. Tools/instruments	4.1 Calculator 4.2 Computer

Curricular Content Guide

1. Underpinning Knowledge	1.1 Numerical concept 1.2 Basic mathematical methods such as addition, subtraction, multiplication and division and percentages. 1.3 Mathematical language, symbols and terminology. 1.4 Measuring units 1.5 Knowledge of computer application
2. Underpinning Skills	2.1 Adding numbers 2.2 Subtracting numbers 2.3 Multiplying numbers 2.4 Dividing numbers 2.5 Measuring of linear 2.6 Using of mathematical language, symbols, terminology and technology 2.7 Measuring of different physical parameter 2.8 Calculating geometrical parameters: angle, parallelism, perpendicularity, area and volume
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices 3.2 Promptness in carrying out activities 3.3 Tidiness and timeliness 3.4 Respect to peers, sub-ordinates and seniors in workplace 3.5 Environmental concern 3.6 Sincerity and honesty
4. Resource Implications	The following resources must be provided. 4.1 Stationeries 4.2 Consumables 4.3 Calculators 4.4 Computers 4.5 Measuring tape

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Identified calculation requirements from workplace information. 1.2 Selected appropriate method to carry out the calculation requirements. 1.3 Completed calculations using appropriate tools/instruments.
2. Methods of Assessment	Methods of assessment may include but not limited to: 2.1 Written test 2.2 Oral questioning 2.3 Demonstration.
6. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **APPLY OCCUPATIONAL HEALTH AND SAFETY (OHS) PRACTICES IN THE WORKPLACE**	**Nominal Duration:** 10 hrs.	**Unit Code:** SEIP-CON-ACD-2-G
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to apply occupational health and safety (OH&S) practices in the workplace. It specifically includes the tasks of identifying OHS policies and procedures, applying personal health and safety practices, reporting hazards and risks and responding to emergencies.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in**bold and underlined**are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Identify OHS policies and procedures	1.1 **OHS policies** and safe operating procedures are read and understood. 1.2 Safety signs and symbols are identified and followed. 1.3 Emergency response, evacuation procedures and other contingency measures are determined.
2. Apply personal health and safety practices	2.1 OHS policies and procedures are followed and practiced. 2.2 **Personal Protective Equipment (PPE)** is selected and used. 2.3 Personal hygiene is maintained.
3. Report hazards and risks	3.1 **Hazards and risks** are identified, assessed and controlled. 3.2 Incidents arising from hazards and risks are reported to authority. 3.3 Corrective actions are implemented to correct unsafe conditions in the workplace.
4. Respond to emergencies	4.1 Alarms and warning devices are responded. 4.2 **Emergency response plans and procedures** are implemented. 4.3 **First aid procedure** is applied during emergency situations.

Range of Variables

Variable	Range May include but not limited to:
1. OHS policies	1.1 International OHS requirements 1.2 Bangladesh standards for OHS 1.3 Building Code 1.4 Fire Safety Rules and Regulations 1.5 Industry Guidelines
2. Personal Protective Equipment (PPE)	2.1 Apron 2.2 Gas Mask 2.3 Gloves 2.4 Safety shoes 2.5 Helmet 2.6 Face mask 2.7 Overalls

	2.8 Goggles and safety glasses 2.9 Ear plugs 2.10 Sun block 2.11 Chemical/Gas masks
3. Hazards and risks	3.1 Chemical hazards. 3.2 Biological hazards. 3.3 Physical Hazards. 3.3.1 Machine hazards. 3.3.2 Materials hazards. 3.3.3 Tools and Equipment hazards.
4. Emergency response plans and procedures	4.1 Firefighting procedures 4.2 Earthquake response procedures 4.3 Evacuation procedures 4.4 Medical and first aid
5. First aid procedure	5.1 Washing of open wound 5.2 Washing chemically infected area 5.3 Applying bandage 5.4 Tourniquet 5.5 Applying CPR (Cardiopulmonary Resuscitation) 5.6 Taking appropriate medicine

Curricular Evidence Guide:

1. Underpinning Knowledge	1.1 OHS workplace policies and procedures. 1.2 Work safety procedures. 1.3 Emergency procedures. 1.3.1 Firefighting. 1.3.2 Earthquake response. 1.3.3 Explosion response. 1.3.4 Accident response. 1.4 Types of (biological, chemical and physical) and their effects. 1.5 PPE types and uses. 1.6 Personal hygiene practices. 1.7 OHS awareness.
2. Underpinning Skills	2.1 Identifying OHS policies and procedures 2.2 Following personal work safety practices 2.3 Reporting hazards and risks 2.4 Responding to emergency procedures 2.5 Maintaining physical well-being in the workplace 2.6 Performing first aids. 2.7 Performing basic firefighting accessories using fire extinguishers 2.8 Applying basic first aide procedures
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices 3.2 Communication with peers, sub-ordinates and seniors in workplace. 3.3 Promptness in carrying out activities. 3.4 Tidiness and timeliness.

	3.5 Respect of peers, sub-ordinates and seniors in workplace. 3.6 Environmental concern. 3.7 Sincere and honest to duties
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 PPEs 4.3 Firefighting equipment 4.4 Emergency response manual 4.5 First aid kits

Assessment Evidence Guide:

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Followed OHS policies and procedures 1.2 Selected and used personal protective equipment (PPE) 1.3 Reported incidents arising from hazards and risks to authority 1.4 Emergency response plans and procedures are implemented 1.5 Applied basic first aide procedure
2. Methods of Assessment	Methods of assessment may include but not limited to: 2.1 Written test 2.2 Demonstration 2.3 Oral questioning 2.4 Interview
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency:	Nominal Duration:	Unit Code:
COMMUNICATE IN ENGLISH IN THE WORKPLACE	14 hrs.	SEIP-CON-ACD-3-G

Unit Descriptor:
This unit covers the knowledge, skills and attitudes required to communicate in English in the workplace. It specifically includes work tasks of reading and understanding workplace documents in English, writing simple workplace written communications in English, listening and comprehending to English conversations and performing conversations in English.

Elements and Performance Criteria:
(Terms in the performance criteria that are written in**bold and underlined**are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Read and understand workplace documents in English	1.1 Workplace documents are read and understood. 1.2 Visual information is interpreted.
2. Write simple workplace communications in English	2.1 Simple **routine workplace documents** are prepared using key words, phrases, simple sentences and **visual aids**are prepared. 2.2 Key information is written in the appropriate places in standard forms.
3. Listen and comprehend to English conversations	3.1 Active listening is demonstrated.
4. Perform conversations in English language	4.1 Conversation is performed in English with peers, customers and management to the required workplace standard.

Range of Variables

Variable	Range May Include but not limited to:
1. Routine workplace documents	1.1 Agenda 1.2 Simple reports such as progress and incident reports 1.3 Job sheets 1.4 Operational manuals 1.5 Brochures and promotional material 1.6 Visual and graphic materials 1.7 Standards 1.8 OSH information 1.9 Signs
2. Visual aids	2.1 Maps 2.2 Diagrams 2.3 Forms 2.4 Labels 2.5 Graphs 2.6 Charts

Curricular Evidence Guide:

1. Underpinning Knowledge	1.1 Read workplace documents in English 1.2 Write simple routine workplace documents in English 1.3 Listen to conversation in English 1.4 Perform conversation in English 1.5 Interaction skills (i.e., teamwork, interpersonal skills, etc.) 1.6 Job roles, responsibilities and compliances
2. Underpinning Skills	2.1 Ability to read and understand workplace documents in English by using appropriate vocabulary and grammar, standard spelling and punctuation 2.2 Ability to write simple routine workplace documents in English such as: Schedules and agenda, job sheets, operational manuals and brochures and promotional material 2.3 Ability of listening in English and interpreting 2.4 Ability to perform conversation in English with peers, customers and management to the required workplace standard 2.5 Work effectively with others 2.5.1 Listening and questioning skills 2.5.2 Ability to follow simple directions
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices 3.2 Promptness in carrying out activities 3.3 Tidiness and timeliness 3.4 Respect of peers, sub-ordinates and seniors in workplace 3.5 Environmental concern. 3.6 Sincere and honest to duties.
4. Resource Implications	The following resources must be provided: 4.1 Work place Procedure 4.2 Materials relevant to the proposed activity 4.3 All tools, equipment, material and documentation required. 4.4 Relevant specifications or work instructions

Assessment Evidence Guide:

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Conversed in English with peers and customers 1.2 Made reports of workplace documents in English
2. Methods of Assessment	Methods of assessment may include but not limited to: 2.1 Written test 2.2 Demonstration 2.3 Oral questioning 2.4 Interview
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **OPERATE IN A SELF-DIRECTED TEAM**	**Nominal Duration:** 8 hrs.	**Unit Code:** SEIP-CON-ACD-4-G
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to operate in a self-directed team. It specifically includes work tasks of identifying team goals and work processes, communicating and cooperating with team members, working and solving problems as a team member.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in**bold and underlined**are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Identify team goals and work processes	1.1 Team goals and collaborative decision making processes are identified. 1.2 Roles and responsibilities of team members are identified. 1.3 Relationships within team and with other workers are maintaned.
2. Communicate and cooperate with team members.	2.1 Effective interpersonal skills are used to interact with team members and to contribute to activities and objectives. 2.2 Formal and informal **forms of communication** are used effectively to support team achievement. 2.3 Diversity in character is respected and valued in team functioning. 2.4 Views and opinions of other team members are understood and valued. 2.5 Workplace terminology is used correctly to assist communication.
3. Work as a team member.	3.1 Duties, responsibilities, authorities, objectives and task requirements are identified and clarified with team. 3.2 Tasks are performed in accordance with organizational and team requirements, specifications and workplace procedures. 3.3 Team member's support with other members are made to ensure team achieves goals, awareness and requirements. 3.4 Agreed reporting lines are followed using standard operating procedure.
4. Solve problems as a team member	4.1 Current and potential problems faced by team are identified. 4.2 A solution to the problem is identified. 4.3 Problems are solved effectively and the outcome of the implemented solution is evaluated.

Range of Variables

Variable	Range May Include but not limited to:
1. Forms of communication	1.1 Agenda 1.2 Simple reports such as progress and incident reports 1.3 Job sheets 1.4 Operational manuals

	1.5 Brochures and promotional material 1.6 Visual and graphic materials 1.7 Standards 1.8 OSH information 1.9 Signs

Curricular Evidence Guide:

1. Underpinning Knowledge	1.1 Team goals and collaborative decision making processes 1.2 Roles and responsibilities of team members 1.3 Relationships within team and with other workers 1.4 Effective interpersonal skills to interact with team members 1.5 Effective formal and informal forms of communication 1.6 Value of diversity in team functioning. 1.7 Correct use of workplace terminology 1.8 Team's duties, responsibilities, authorities, objectives and task requirements 1.9 Support mechanism to other members of team to ensure achievements of goals 1.10 Methods of identifying current and potential problems faced by a team 1.11 Effective problems solving methods and evaluation of outcomes
2. Underpinning Skills	2.1 Identifying team goals and collaborative decision making processes 2.2 Identifying roles and responsibilities of team members 2.3 Identifying relationships within team and with other workers 2.4 Using effective interpersonal skills to interact with team members and to contribute to activities and objectives 2.5 Using formal and informal forms of communication 2.6 Understanding and valuing views and opinions of other team members 2.7 Performing tasks in accordance with organizational and team requirements, specifications and workplace procedures 2.8 Supporting other members of the team to ensure team achieves goals, awareness and requirements 2.9 Identifying current and potential problems faced by the team 2.10 Identifying solutions to the problem 2.11 Solving problems effectively and evaluating the outcome of the implemented solution
3. Underpinning Attitudes	3.1 Teamwork 3.2 Promptness in carrying out activities 3.3 Tidiness and timeliness 3.4 Respect of peers, sub-ordinates and seniors in workplace 3.5 Sincere and honest to duties
4. Resource Implications	The following resources must be provided: 4.1 Workplace (simulated or actual)

	4.2 Pens 4.3 Papers 4.4 Work books 4.5 Learning manuals

Assessment Evidence Guide:

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Identified team goals and work processes 1.2 Communicated and cooperated with team members 1.3 Worked as a team member 1.4 Solved problems as a team member
2. Methods of Assessment	Methods of assessment may include but not limited to: 2.1 Written test 2.2 Demonstration 2.3 Oral questioning 2.4 Interview
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

B. The Sector Specific (Common) Competencies

Unit of Competency: **TRANSLATEDRAWINGS, PLANS AND SPECIFICATIONS**	**Nominal Duration:** 10 hrs	**Unit Code:** SEIP-CON-ACD-1-S
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to translate drawings, plans and specifications. It specifically includes the tasks of carry out basic engineering drawings applied in construction, accessing information from manuals, designs and plans, interpreting drawings and specifications from manuals, designs and plans and storing manuals, designs and plans.		

Elements and Performance Criteria Template:
(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables)

Elements of Competency	**Performance Criteria**
1. Carry out basic engineering drawings applied in construction	1.1 Basic **shapes and objects** are sketched. 1.2 Skills to properly use **manual drafting equipment** is demonstrated. 1.3 **Geometric shapes** utilizing manual drafting equipment is created. 1.4 Communicatin through manual lettering is clearly demonstrated.
2. Access information from manuals, designs and plans	1.5 Appropriate **manuals** are identified and accessed. 1.6 Version and date of the manual are checked to ensure up-to-date specifications of tools, equipment, materials and procedures.
3. Interpret drawings and specifications from manuals, designs and plans	2.1 Relevant **drawings** and **specifications** are correctly recognized from manuals, designs and plans. 2.2 Terms and abbreviations are recognized. 2.3 **Signs and symbols** are interpreted.
4. Store manuals, designs and plans	3.1 Manuals, designs and plans are collected and packed. 3.2 Manuals, designs and plans are stored to prevent damage, and ready access and updating of information when required.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. Shapes and objects	1.1 Lines 1.2 Geometrical shapes 1.3 Projections 1.4 Pictorial drawings 1.5 Isometric drawings
2. Manual drafting equipment	2.1 Pencils 2.2 Compass 2.3 Divider 2.4 Triangles 2.5 French curve

	2.6 Protractor 2.7 Eraser
3. Geometric shapes	3.1 Circle 3.2 Oval 3.3 Ellipse 3.4 Square 3.5 Rectangle 3.6 Polygons
4. Manuals	4.4 Manufacturer's Specification Manual 4.5 Repair Manual 4.6 Maintenance Procedure Manual 4.7 Periodic Maintenance Manual 4.8 Quality Manual 4.9 Instruction Manual
5. Drawings	5.1 Technical drawings 5.2 Sketches
6. Specifications	6.1 Product specifications 6.2 Performance specifications 6.3 Method specifications
7. Signs and symbols	7.1 Refers to all signs and symbols associated in the construction sector

Curricular Content Guide

1. Underpinning Knowledge	1.1 Methods and techniques of sketching/drawing of basic shapes and objects 1.2 Types and use of manual drafting equipment 1.3 Types of geometric shapes 1.4 Techniques of sketching using manual drafting equipment 1.5 Standard technical/engineering lettering 1.6 Types of construction manuals 1.7 Identification of signs and symbols 1.8 Identification of units of measurement 1.9 Identification of units of conversion 1.10 Drawings and specifications 1.11 Terms and abbreviations used
2. Underpinning Skills	2.1 Sketching/drawing of basic shapes and objects 2.2 Using of manual drafting equipment 2.3 Sketching using manual drafting equipment 2.4 Lettering using standard technical/engineering lettering 2.5 Checking version and date of the manual to ensure up-to-date specifications of tools, equipment, materials and procedures 2.6 Identifying relevant drawings and specifications correctly 2.7 Identifying terms and abbreviations 2.8 Identifying signs and symbols 2.9 Interpreting drawings and specifications 2.10 Interpreting schedules, dimensions and specifications

	contained in the drawings 2.11 Storing manuals
3. Underpinning Attitudes	3.1 Eagerness to learn 3.2 Orderliness 3.3 Resourcefulness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Different types of construction manuals and literatures 4.3 Pens 4.4 Papers 4.5 Work books

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Sketched shapes and objects using manual drafting equipment 1.2 Checked version and date of manual to ensure up-to-date specifications of tools, equipment, materials and procedures 1.3 Identified relevant drawings and specifications correctly 1.4 Identified terms and abbreviations 1.5 Identified signs and symbols 1.6 Interpreted construction drawings and specifications 1.7 Interpreted schedules, dimensions and specifications contained in the drawings
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: CARRY OUT MEASUREMENTS AND CALCULATIONS	Nominal Duration: 10 hrs.	Unit Code: SEIP-CON-ACD-2-S
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to carry-out construction measurements and calculations. It specifically includes the tasks of checking usability of measuring devices, carrying out accurate construction work measurements, executing simple construction work calculations and cleaning and maintaining measuring instruments.		

Elements and Performance Criteria Template:
(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Check usability of measuring devices	1.1 Appropriate **measuring device** is selected for the job. 1.2 Applications of measuring device is determined. 1.3 Usability of measuring device is checked and verified. 1.4 Measuring device is prepared.
2. Carry out accurate construction work measurements	2.1 Working drawings are analyzed. 2.2 Measurements are obtained using appropriate measuring device. 2.3 **Systems of measurements** are identified and converted where necessary. 2.4 Measurement results are confirmed and recorded. 2.5 Materials requirements are estimated. 2.6 Tools and equipment are identified. 2.7 Manpower requirements and skills are identified.
3. Execute simple construction work calculations	3.1 Simple calculations involving **four basic mathematical operations** are executed. 3.2 Other operations are used to complete tasks in construction works. 3.3 Appropriate formulas for calculating quantities of materials are selected. 3.4 Calculations are performed and verified. 3.5 Material quantities are calculated. 3.6 Results are interpreted and communicated to authority.
4. Clean and maintain measuring instruments	4.1 Dust and foreign matters are removed from measuring instrument. 4.2 Check condition of instrument. 4.3 Apply appropriate lubricant after use and prior to storage. 4.4 Measuring instruments are checked and calibrated. 4.5 Store instrument in accordance to workplace procedure.

Range of Variables

Variable	Range (Includes but not limited to):
1. Measuring device	1.1 Set squares 1.2 Tri-square

	1.3 Dial indicators 1.4 Micrometers 1.5 Slide calipers 1.6 Steel tape (measure tape) 1.7 Steel rule 1.8 Feeler gauges 1.9 Steel Protractor 1.10 Universla Bevel Protractor
2. Systems of measurements	2.1 ISO standard 2.2 English system 2.3 Metric system
3. Four basic mathematical operations	3.1 Addition 3.2 Subtraction 3.3 Multiplication 3.4 Division

Curricular Content Guide

1. Underpinning Knowledge	1.1 Techniques of analyzing working drawings 1.2 Types and principles of operation of measuring devices 1.3 The ISO standard of measurements 1.4 Methods of measurement and calculation 1.5 Fraction and decimals 1.6 Linear measurement 1.7 Units of conversion and conversion factors in measurements 1.8 Dimensioning and fits and tolerances 1.9 Calculating ratio and proportion 1.10 Care in the use of measuring devices 1.11 Procedure of estimating materials requirements 1.12 Tools and equipment identification methods 1.13 Method of identifying manpower requirements and skills
2. Underpinning Skills	2.1 Analyzing working drawings 2.2 Selecting appropriate measuring device for the job 2.3 Checking and verifying usability of measuring device 2.4 Obtaining measurements using appropriate measuring device. 2.5 Confirming measurements and recording results 2.6 Carrying out simple calculations involving four basic mathematical operations 2.7 Calculating material quantities 2.8 Identifying tools and equipment 2.9 Identifying manpower requirements and skills 2.10 Interpreting and communicating results to authority 2.11 Cleaning and storing measuring instruments
3. Underpinning Attitudes	3.1 Cleanliness/tidiness 3.2 Commitment to occupational health and safety practices 3.3 Environmental concerns

	3.4 Eagerness to learn 3.5 Timeliness and orderliness 3.6 Respect for rights of peers and seniors in workplace 3.7 Orderliness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Different types of measuring and checking tools/instruments 4.3 Pens 4.4 Papers 4.5 Work books 4.6 Measuring tools operating and maintenance manual

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Selected appropriate measuring device for the job 1.2 Checked and verified usability of measuring device 1.3 Obtained measurements using appropriate measuring device 1.4 Confirmed measurements and recorded results 1.5 Carried out simple calculations involving four basic mathematical operations 1.6 Calculated material quantities 1.7 Interpreted and communicated results to authority
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **OPERATE A COMPUTER**	**Nominal Duration:** 14 Hrs.	**Unit Code:** SEIP-CON-ACD-3-S
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to operate a personal computer and use office applications. It specifically includes the tasks of starting and shutting down the computer, accessing basic system information, working with files and folders and user application programs and printing documents.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Start and shut down the computer	1.1 **Peripheral devices** are checked for correct connection, position and usability. 1.2 Input **electrical parameters** of the device are checked in accordance with peripheral device specification. 1.3 Power of computer and other peripheral devices are switched on. 1.4 All open **applications programs** are logged out in accordance with standard application procedure. 1.5 All open files/documents are exited. 1.6 Personal computer is shut down in accordance with standard shut off procedure. 1.7 The computer and other peripherals are switched off and unplugged power supply in accordance with standard procedure.
2. Access basic system information	2.1 User name and password as prompted and note access, privacy, security and related conditions of use displayed on introductory screens are Inserted. 2.2 PC desktop environment/**Graphical User Interface (GUI)** settings is arranged and customized. 2.3 The **operating system**informationis identified. 2.4 System configuration and application versions in operation are navigated. 2.5 On-line help functionsare used as required.
3. Work with files, folders and user application programs	3.1 Desktop environment is navigated and manipulated. 3.2 Desktop icons are selected, opened and closed to access application programs. 3.3 Application windows and return to desktop original condition are manipulated. 3.4 Basic directory and sub-directories are created and named. 3.5 **Attributes**of directories are identified. 3.6 Files for user and organization requirements are created and

	organized. 3.7 Data are entered into the desired office application in accordance with work requirements. 3.8 Files are copied and saved to available **data storage**/disk drives.
4. Print documents	4.1 **Printer settings**, if required, are entered into the program. 4.2 Default printer is changed where necessary. 4.3 Print command is entered to effect printing of documents. 4.4 Adjust document print output where necessary.

Range of Variables

Variable	Range (Includes but not limited to:)
1. Peripheral devices	1.1 Input Devices 1.1.1 keyboard , MIDI keyboard 1.1.2 mouse 1.1.3 touchscreen 1.1.4 pen tablet 1.1.5 joystick 1.1.6 scanner 1.1.7 digital camera 1.1.8 video camera 1.1.9 microphone 1.2 Output Devices 1.2.1 monitor 1.2.2 projector 1.2.3 tv screen 1.2.4 printer 1.2.5 plotter 1.2.6 speakers 1.3 Both input/output 1.3.1 external hard drives 1.3.2 USB drives 1.3.3 media card readers 1.3.4 digital camcorders 1.3.5 digital mixers 1.3.6 MIDI equipment
2. Electrical parameters	2.1 Voltage 2.1.1 AC volts 2.1.2 DC volts 2.2 Current (Ampere) 2.3 Phase 2.4 Cycle
3. Applications programs	3.1 Office programs 3.2 Database programs 3.3 Word processors 3.4 Email programs 3.5 Internet browsers

	3.6 System browsers 3.7 Spreadsheets
4. Desktop environment/Graphical User Interface (GUI)	4.1 Desktop 4.2 Pointer 4.3 Icons 4.4 Menus 4.5 Dialog boxes 4.6 Scroll bars 4.7 Toolbars 4.8 Folders 4.9 Wall papers 4.10 Widgets
5. Operating system	5.1 Microsoft Windows 5.2 Apple Mac OS 5.3 Ubuntu Linux 5.4 Google android 5.5 IOS
6. Data storage	6.1 Random Access Memory (RAM) 6.2 Floppy disk 6.3 Hard disk 6.4 CD disk 6.5 DVD disk 6.6 Flash drive 6.7 External hard disk
7. Printer settings	7.1 Default Printer Brand and model 7.2 Pages 7.3 Printing sides 7.4 Collate 7.5 Page orientation 7.6 Paper size 7.7 Margins 7.8 Number of pages per sheet

Curricular Content Guide

1. Underpinning Knowledge	1.1 Basic software operation 1.2 Methods and procedure of checking input electrical parameters 1.3 Steps/procedure n switching on the power of computer and other peripheral devices 1.4 Computer functions 1.5 Basic parts of a computer and various hardware components 1.6 Organizational benchmarks for minimum typing skills, including speed and accuracy 1.7 Creating and opening documents 1.8 Formatting documents 1.9 Inserting tables and images

	1.10 Saving, printing and closing documents 1.11 Mail merge function 1.12 Basic keyboarding skills 1.13 Storage devices and basic categories 1.14 Exiting procedure for open files/documents 1.15 Methods and procedure in witching on and off the computer and other peripherals 1.16 Selection, opening and closing procedures of desktop icons to access application programs 1.17 Method of creating and organizing files for user and organization requirements 1.18 Data inputting techniques in accordance with standard typing procedure and office application 1.19 Printing procedure and commands
2. Underpinning Skills	2.1 Checking input electrical parameters of the device in accordance with peripheral device specification. 2.2 Switching on power of computer and other peripheral devices. 2.3 Exiting all open files/documents . 2.4 Switching off the computer and other peripherals and unplugging power supply in accordance with standard procedure. 2.5 Arranging, customizing and manipulating PC desktop environment/graphical user interface (GUI) settings. 2.6 Selecting, opening and closing desktop icons to access application programs. 2.7 Creating and organizing files for user and organization requirements. 2.8 Entering data into the desired office application in accordance with work requirements 2.9 Entering print command to effect printing of documents
3. Underpinning Attitudes	3.1 Eagerness to learn 3.2 Patience 3.3 Orderliness 3.4 Observance to OHS requirements
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Personal computer and peripherals 4.3 Softwares 4.4 Pens 4.5 Papers 4.6 Work sheets

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Checked input electrical parameters of the device in accordance with peripheral device specification. 1.2 Switched on power of computer and other peripheral devices.

	1.3 Exited all open files/documents. 1.4 Switched off computer and other peripherals and unplugged power supply in accordance with standard procedure. 1.5 Arranged, customized and manipulated PC desktop environment/Graphical User Interface (GUI) settings. 1.6 Selected, opened and closed desktop icons to access application programs. 1.7 Created and organizedfiles for user and organization requirements. 1.8 Entered data into the desired office application in accordance with work requirements. 1.9 Entered print command to effect printing of documents.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module

C. The Occupation Specific (Core) Competencies

Unit of Competency: **PERFORM AUTOCAD 2D FUNDAMENTALS**	**Nominal Duration:** 30hrs.	**Unit Code:** SEIP-CON-ACD-1-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to apply AutoCAD 2D fundamentals**.** It specifically includes the tasks of controlling display in drawings, creating basic drawings and manipulating objects as desired.		

Elements and Performance Criteria Template:
(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables)

Elements of Competency	Performance Criteria
1. Control display in drawings	1.1 AutoCAD drawing files are created. 1.2 AutoCAD drawing files are saved in proper format. 1.3 The AutoCAD **visual reference commands**is operated.
2. Create basic drawings	2.1 **Line commands**are executed. 2.2 **Circle commands**are used. 2.3 Positions using the basic entry methods are defined. 2.4 **Basic drawings** in 2D are created.
3. Manipulate objects as desired	3.1 The erase command is identified. 3.2 The AutoCAD Pan realtime option isrecognized.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. Visual reference commands	1.1 Zoom Extent 1.2 Drawing LIMITS 1.3 Status Bar 1.4 GRID Display 1.5 PAN Real time
2. Line commands	2.1 Format 2.2 Units Setup 2.3 LINE command 2.4 Coordinates 2.5 Interactive Input method 2.6 SNAP Option 2.7 World space 2.8 User coordinate system 2.9 World coordinate system 2.10 UCS icon Display
3. Circle commands	3.1 TTR 3.2 Relative Coordinate 3.3 Coordinate systems

	3.4 Cartesian coordinate system 3.5 Absolute coordinates 3.6 Positions 3.7 Defining LINE 3.8 Close option 3.9 CIRCLE command 3.10 TTT
4. Basic drawings	4.1 Plan, elevation, details of project 4.2 Layout plan; column, foundation 4.3 Details; foundation, column, grade beam, stair, liftpit, underground water reservoir, septik tank and soakpit, floor beam and floor slab, lintel and sunshade, false slab, dropwall, paraphat wall, overhead waer tank, abutment wall, pierc, deck slab, pile and pile cap

Curricular Content Guide

1. Underpinning Knowledge	1.1 Quality, condition, or fact of being exact and accurate which is also called Precision 1.2 Different autocad visual reference commands 1.3 Types of various Line commands 1.4 Required circle command for specific purpose 1.5 ERASE command 1.6 Method of describing selection window 1.7 Procedure of creating basic drawings in 2D
2. Underpinning Skills	2.1 Creating AutoCAD drawing files 2.2 Saving AutoCAD drawing files in proper format 2.3 Operating the AutoCAD visual reference commands 2.4 Executing line commands 2.5 Using circle commands 2.6 Defining positions using the basic entry methods are 2.7 Identifying the erase command 2.8 Recognizing the AutoCAD pan realtime option 2.9 Creating basic drawings in 2D
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices 3.2 Concern to environmental care 3.3 Eagerness to learn 3.4 Tidiness, timeliness, and orderliness 3.5 Respect for rights of peers and seniors in workplace 3.6 Communication with peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Personal Computer/laptop 4.3 AutoCAD software 4.4 Workplace rules and regulation policy manual 4.5 Pens 4.6 Papers 4.7 Work books

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Operated The AutoCAD visual reference commands 1.2 Executed line commands 1.3 Used circle commands 1.4 Recognized the AutoCAD pan realtime option 1.5 Created basic drawings in 2D
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **CREATE 3D INTERFACE/DRAWINGS**	**Nominal Duration:** 48 hrs.	**Unit Code:** SEIP-CON-ACD-2-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to create 3D interface/drawings. It specifically includes the tasks of developing familiarity with 3D basics interface in AutoCAD,introducing thickness and elevation, visualizing the model and drawing of coordinates.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables)

Elements of Competency	Performance Criteria
1. Develop familiarity with 3D basics interface in AutoCAD	1.1 Different options to draw **3d basic ribbons** is used. 1.2 The steps of executing **Pull Down Menus**are recognized. 1.3 The steps to apply **3D modelling panels** are executed. 1.4 Options on **3D modelling pull down menus**are identified. 1.5 Viewports (-**VPORTS command**) are Identified. 1.6 The technique to track the **cursor (Steering Wheel)**is applied. 1.7 **Viewpoints**are Identified.
2. Introduce thickness andelevation	2.1 Thickness command at command promptwith different values is applied. 2.2 General properties of anobject are modified. 2.3 The “Elev” command at command prompt withdifferent values are executed.
3. Visualize the model	3.1 Different stylesare identified. 3.2 **Different styles**are managed. 3.3 Different **visual functions** are applied.
4. Draw coordinates	4.1 Basic terminologies of Z coordinates are explained. 4.2 **User Coordinates System (UCS)** command with multiple switches is applied. 4.3 3D user and Z Cartesian (X,Y,Z) coordinates system is drawn.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. 3D Basic Ribbons	May include but not limited to: 1.1 Create 1.2 Edit 1.3 Draw 1.4 Modify 1.5 Selection 1.6 Coordinates 1.7 Layers 1.8 Views
2. Pull Down Menus	2.1 Home 2.2 Render

	2.3 Insert 2.4 Manage 2.5 Output 2.6 Plug-ins 2.7 Online 2.8 Express Tools
3. 3D modelling panels	3.1 Modelling 3.2 Mesh 3.3 Solid 3.4 Editing 3.5 Draw 3.6 Modify 3.7 Section, 3.8 Coordinates 3.9 View 3.10 Selection 3.11 Layers 3.12 Groups
4. 3D Modelling Pull down menus	4.1 Home 4.2 Solid 4.3 Surfaces 4.4 Mesh 4.5 Render 4.6 Parametric 4.7 Insert 4.8 Annotate 4.9 View 4.10 Manage 4.11 Output 4.12 Plug-ins 4.13 Online express tools
5. VPORTS command	5.1 Pre-set 3D Viewports 5.2 Named Views.
6. Cursor (Steering Wheel)	6.1 Over wedge as full navigation wheel 6.2 View object wheel 6.3 Orbit, walk up/down 6.4 Rewind and its setting
7. Viewpoints	7.1 VPOINT command (Rotate switch, DDVPOINTcommand) 7.2 PLAN command

8. Different styles	8.1 2D Wireframe 8.2 3D Wireframe 8.3 3D Hidden 8.4 Realistic 8.5 Shaded 8.6 Shaded with Edges 8.7 Shades of Gray 8.8 Sketchy 8.9 X-Ray
9. Visual functions	9.1 Regenerate a three-dimensional model with hiddenlines using HIDE command. 9.2 Set the grid with DSETTINGS command
10. User Coordinates System (UCS)	10.1 Face 10.2 Named 10.3 Object 10.4 Previous 10.5 New 10.6 View 10.7 World 10.8 X/Y/Z.

Curricular Content Guide

1. Underpinning Knowledge	1.1 Method of drawing 3D Basic Ribbons using different tools 1.2 Different options of Pulldown menus 1.3 3D Modelling interface (Panels, Pulldown menus). 1.4 Different options on 3D Modelling Pulldown menus 1.5 Different Viewport options 1.6 Different techniques to track thecursor (Steering Wheel) 1.7 Vpoint, DDVpoint and Plan View techniques. 1.8 Method of executing the “Thickness” command at command prompt 1.9 Method of setting the elevation of object 1.10 Definition of different styles 1.11 Explain how to manage different styles using different options 1.12 Different visual functions (hide, grid) 1.13 Basic terminologies of Z coordinates 1.14 The user coordinates system 1.15 3D user and Z Cartesian (X,Y,Z) coordinates system
2. Underpinning Skills	2.1 Using different options to draw 3D basic ribbons 2.2 Recognizing the steps of executing pull down menus 2.3 Executing the steps to apply 3D modelling panels 2.4 Identifying options on 3D modelling pull down menus 2.5 Identifying Viewports (-Vports command) 2.6 Applying the technique to track the cursor (steering wheel) 2.7 Identifying viewpoints 2.8 Applying thickness command at command prompt with

	different values 2.9 Modifying general properties of an object 2.10 Executing the "Elev" command at command prompt with different values 2.11 Identifying different styles 2.12 Managing different styles 2.13 Applying different visual functions 2.14 Explaining basic terminologies of Z coordinates 2.15 Defining user coordinates system 2.16 Drawn 3D user and Z Cartesian (X,Y,Z) coordinates system
3. Underpinning Attitudes	3.1 Patience 3.2 Commitment to occupational health and safety 3.3 Environmental concerns 3.4 Eagerness to learn 3.5 Tidiness and timeliness 3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Various Channels and cables 4.3 Personal computer/laptop 4.4 Auto CAD software 4.5 Work instruction sheet 4.6 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Executed the steps to apply 3D modelling panels 1.2 Identified options on 3D modelling pull down menus 1.3 Applied thickness command at command promptwith different values 1.4 Executed "Elev" command at command prompt withdifferent values 1.5 Applied different visual functions 1.6 Drawn 3D user and Z Cartesian (X,Y,Z) coordinates system
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral Interview 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **DRAW 3D ORBIT, NAVIGATIONS AND MODEL**	**Nominal Duration:** 34 hrs.	**Unit Code:** SEIP-CON-ACD-3-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to draw 3D orbit, navigations and model. It specifically includes the tasks of developing familiarity with 3D Orbit, performing 3D dimensional navigation and operating 3D Object.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Develop familiarity with 3D Orbit	1.1 3D orbit in **various command** is defined. 1.2 Different **visual aids**areselected. 1.3 3D view while in the orbit command using pre- set views is set. 1.4 Free and Continuous orbitis differentiated highlighting the use of "Esc" key. 1.5 Other navigational modes is discovered including but not limited to walk, fly, swivel and adjust distance.
2. Perform 3D dimensional navigation	2.1 **Functions of camera** is dealt with. 2.2 Parallel projection or perspective views is performed by using a camera and target with the help of"DVIEW" command. 2.3 Walking and flying through a 3D drawing and their setting is Simulated. 2.4 "ANIPATH" command for animation pathis executed.
3. Operate 3D Object	3.1 Wireframe models is created by positioning 2D objects anywhere in 3D space. 3.2 Faceted surfaces is drawnusing a polygonal mesh. 3.3 Different simple shapes are combined to create more complex solids by joining or subtracting them or finding their intersecting (over- lapping) volume.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. Various command	1.1 "3D orbit" for constrained orbit on selected object 1.2 Developing zoom

	1.3 Pan facility 1.4 Projection mode by selecting “Perspective” 1.5 Select different visual styles i.e. 3D Hidden, 3D 1.6 Wireframe, Conceptual, and Realistic.
2. Visual aids	2.1 Compass 2.2 Grid and 2.3 UCS Icon
3. Functions of camera	3.1 Creation 3.2 View 3.3 Preview 3.4 Properties 3.5 Plotting 3.6 Display 3.7 Adjust 3.8 Swivelling 3.9 Distance

Curricular Content Guide

1. Underpinning Knowledge	1.1 Definition of the working of 3D Orbit (constrained, free and continuous) 1.2 Different types of projection and navigational modes. 1.3 Visual aids and styles 1.4 Designing and creating camera 1.5 Means of plotting and adjusting the camera 1.6 Parallel projection or perspective views 1.7 Illustration of walk and fly settings 1.8 Method of describing the different animation paths 1.9 Structure of wireframes 1.10 Definition of the process of application of surfaces 1.11 Method of creating Solids
2. Underpinning Skills	2.1 Defining 3D orbit in various command 2.2 Selecting different visual aids 2.3 Setting 3D view while in the orbit command using pre-set views 2.4 Differentiating free and continuous orbit highlighting the use of “ESC” key. 2.5 Discovering other navigational modes including but not limited to walk, fly, swivel, and adjust distance 2.6 Dealing with functions of camera 2.7 Using parallel projection or perspective views performed by a camera and target with the help of “DVIEW” command. 2.8 Simulating walking and flying through a 3d drawing and their setting 2.9 Executing “ANIPATH” command for animation path 2.10 Creating wireframe models by positioning 2D objects anywhere in 3D space

	2.11 Drawing faceted surfaces using a polygonal mesh 2.12 Combining different simple shapes to create more complex solids by joining or subtracting them or finding their intersecting (over- lapping) volume.
3. Underpinning Attitudes	3.1 Concern for work quality 3.2 Cleanliness/tidiness 3.3 Commitment to occupational health and safety practices 3.4 Environmental concerns 3.5 Eagerness to learn 3.6 Timeliness and orderliness 3.7 Respect for rights of peers and seniors in workplace 3.8 Orderliness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Various Channels and cables 4.3 Personal computer/laptop 4.4 Auto CAD software 4.5 Work instruction sheet 4.6 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Defined 3D orbit in various command 1.2 Set 3D view while in the orbit command using pre- set views 1.3 Executed “ANIPATH” command for animation path 1.4 Combined Different simple shapes to create more complex solids
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **PRODUCE 2D SOLID AND 3D FACES**	**Nominal Duration:** 34 hrs.	**Unit Code:** SEIP-CON-ACD-4-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to produce 2D solid and 3D faces. It specifically includes the tasks of Drawing 2D Solids and 3D Faces and Drawing of Edges.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Draw 2D Solids and 3D Faces	1.1 SOLID" command with points to be filled is executed. 1.2 "3D FACE" command with points to be filled is used. 1.3 A three-dimensional polyface mesh vertex using "PFACE" command and pick points is created.
2. Draw edges	2.1 The **"EDGE" command** is executed. 2.2 3D faces with invisible edges are drawn.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. "EDGE" command	1.1 Toggle visibility 1.2 Hidden edges

Curricular Content Guide

1. Underpinning Knowledge	1.1 Method of creating solid-filled triangles and quadrilaterals 1.2 Method of creating four sided surface anywherein 3D space 1.3 Procedure of creating edges 1.4 Procedure of drawing 3D faces with invisible edges
2. Underpinning Skills	2.1 Executing "solid" command with points to be filled 2.2 Using "3D face" command with points to be filled 2.3 Creating a three-dimensional polyface mesh vertex using"PFACE" command and pick points 2.3 Executing the "edge" command 2.4 Drawing 3d faces with invisible edges

3. Underpinning Attitudes	3.1 Concern for work quality 3.2 Cleanliness/tidiness 3.3 Commitment to occupational health and safety 3.4 Eagerness to learn 3.5 Timeliness and orderliness 3.6 Respect for rights of peers and seniors in workplace 3.7 Orderliness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Various channels and cables 4.3 Personal computer/laptop 4.4 Auto CAD software 4.5 Work instruction sheet 4.6 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Created a three-dimensional polyface mesh vertex using“PFACE” command and pick poin.ts 1.2 Executed the “edge” command. 1.3 Drawn 3D faces with invisible edges.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **INSERT SURFACES**	**Nominal Duration:** 34 hrs.	**Unit Code:** SEIP-CON-ACD-5-O
Unit descriptor: This unit covers the knowledge, skills and attitudes required to insert surfaces in Civil Auto CAD Operation work. It specifically includes the tasks of drawing basic 3D surface and creating complex 3D surfaces.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Draw basic 3D surface	1.1 Mesh tab is located from 3D Modelling dropdown option of **solid panel.** 1.2 Different **mesh primitive options** are applied. 1.3 Smoothness and refinement are applied using **meshes commands**. 1.4 **Mesh Creasecommands**are used. 1.5 **Mesh editing commands** are used to enable mesh editing. 1.6 CONVTOSURFACE command is used to convert Meshes.
2. Create complex 3D surfaces	2.1 Surfaces are developed using identified **surface commands.** 2.2 3D solid or surface are created in the space between several cross sectionsusing **appropriate commands.** 2.3 Surface Network is built. 2.4 A blend surface is created between two existing surfaces using "SURFBLEND" command. 2.5 A new surface or cap is created to close an open edge of an existing surface using "SURFPATCH" command. 2.6 A parallel surface is created at a specified distance from the original surface using "SURFOFFSET" command. 2.7 **Editing commands** are used to edit existing surfaces. 2.8 Control vertices are added and edited on a NURBS surface or spline using Surface CV edit bar. 2.9 Object is converted to NURBS using "CONVTONURBS" command. 2.10 Following **NURB Vertex Controls** are applied. 2.11 Surface **analysis tools** are used. 2.12 Surface associativity is developed. 2.13 **Complex 3D surfaces** are created.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. Solid panel	1.1 Primitive panel 1.2 Drop-down
2. Mesh primitive options	2.1 Box 2.2 Cone 2.3 Cylinder 2.4 Pyramid 2.5 Sphere 2.6 Wedge 2.7 Tours
3. Meshes commands	3.1 MESHSMOOTHMORE 3.2 MESHSMOOTHLESS 3.3 MESHSMOOTHREFINE
4. Mesh Crease commands	4.1 MESHCREASE 4.2 MESHUNCREASE
5. Mesh editing commands	5.1 MESHEXTRUDE 5.2 MESHSPLIT (mid point) 5.3 MESHMERGE 5.4 MESHCAP (close hole)
6. Surface commands	6.1 Revolved Surface (REVSURF) 6.2 Tabulated Surface (TABSURF) 6.3 Ruled Surface (RULESURF) using “Surftab” variables 6.4 Edge Surface (EDGESURF) 6.5 Plane Surface (PLANESURF) 6.6 Extrude Surface (EXTRUDE)
7. Appropriate commands	7.1 Using “LOFT” command. 7.2 Sweeping a 2D or 3D curve along a path using “SWEEP” command.
8. Editing commands	8.1 Fillet 8.2 Trim 8.3 Untrim 8.4 Extend 8.5 Sculpt
9. NURB Vertex Controls	9.1 Surface CV-Show 9.2 Surface CV-Hide 9.3 Surface CV-Rebuild 9.4 Surface CV-Add 9.5 Surface CV-Remove
10. Analysis tools	10.1 Analysis Zebra 10.2 Analysis Curvature 10.3 Analysis Draft
11. Complex 3D surfaces	11.1 3d elevation 11.2 Animation 11.3 Rendering 11.4 Clear presentation

Curricular Content Guide

1. Underpinning Knowledge	1.1 Different types of mesh primitive options 1.2 Mehtod of creating smooth and refine Meshes 1.3 Process of editing existing Meshes 1.4 Procedure of converting Meshes 1.5 Method of identifying different surfaces 1.6 Surfaces editing procedures 1.7 Surface Network 1.8 Method of applying NURB controls on surfaces 1.9 Surfaces analysis 1.10 Surface associativity 1.11 Procedures and techniques in creating Complex 3D surfaces
2. Underpinning Skills	2.1 Locating mesh tab from 3D modelling dropdown option of solid panel 2.2 Applying different mesh primitive options 2.3 Applied smoothness and refinement using meshes commands 2.4 Using Mesh Crease commands 2.5 Using Mesh editing commands to enable mesh editing 2.6 Using CONVTOSURFACE command to convert Meshes 2.7 Developing surfaces using identified surface commands 2.8 Creating 3d solid or surface in the space between several cross sections using appropriate commands. 2.9 Building Surface Network. 2.10 Creating a blend surface between two existing surfaces using “SURFBLEND” command 2.11 Creating a new surface or cap to close an open edge of an existing surface using “SURFPATCH” command. 2.12 Creating a parallel surface at a specified distance from the original surface using “SURFOFFSET” command 2.13 Using editing commands to edit existing surfaces 2.14 Adding and editing control vertices on a NURBS surface or spline using Surface CV edit bar. 2.15 Converting object to NURBS using “CONVTONURBS” command. 2.16 Applying following NURB Vertex Controls 2.17 Usingsurface analysis tools 2.18 Developing surface associativity 2.19 Creating Complex 3D surfaces
3. Underpinning Attitudes	3.1 Cleanliness/tidiness 3.2 Commitment to occupational health and safety and safety 3.3 Eagerness to learn 3.4 Timeliness and orderliness 3.5 Respect for rights of peers and seniors in workplace 3.6 Orderliness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Various Channels and cables 4.3 Personal computer/laptop

	4.4 Auto CAD software 4.5 Work instruction sheet 4.6 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Used mesh editing commands to enable mesh editing. 1.2 Developed surfaces using identified surface commands. 1.3 Used editing commands to edit existing surfaces. 1.4 Used surface analysis tools. 1.5 Create complex 3D surfaces. 1.6 Created complex 3D surfaces.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **DEVELOP SOLID IMAGES**	**Nominal Duration:** 34hrs.	**Unit Code:** SEIP-CON-ACD-6-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to develop solid images in Civil Auto CAD Operation work. It specifically includes the tasks of creating images, editing 3D Objects, developing 3D Solid composites, and perform solid image modification.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Create images	1.1 Solid primitives tab is launched from 3D Modeling dropdownoption of solids panel. 1.2 **Figures to a solid**are convertedwith a rectangular profile using "Polysolid" command. 1.3 Unique solid primitives are created by extruding existing two-dimensional objects using "Extrude" command withtaper and path. 1.4 **Commands** are executed on solids.
2. Edit 3D Objects	2.1 Polylines and circles are convertedto 3D solids using "convtosolid" command. 2.2 Existing solids are edited using **solid editing commands.** 2.3 Edges of a 3D object using "_xedges" command areextracted. 2.4 The smoothness of shaded and rendered objectsare adjusted using "FACETRES" command with valid values range. 2.5 "ISOLINES" and "REGEN" command are applied to regenerate the3D drawing in 3D view.
3. Develop 3D Solidcomposites	3.1 **Composite functions**are applied on solids. 3.2 3D solid is createdby thickening a surface using "THICKEN"command. 3.3 3D solids that overlap are highlightedusing "INTERFERE" command.
4. Perform solid image modification	4.1 Appropriate **modification commands** are used to modify solid faces. 4.2 "Imprint" facility is appliedon **Figures**. 4.3 Edit solid objects using appropriate modification commands.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. Figures to a solid	1.1 An existing line 1.2 2D polyline 1.3 Arc 1.4 Circle
2. Commands	2.1 Revolve 2.2 Sweep 2.3 Loft
3. Solid editing commands	3.1 3D Move 3.2 3D Rotate 3.3 3D Align 3.4 3D Mirror 3.5 3D Rectangular Array 3.6 3D Polar Array
4. Composite functions	4.1 Union 4.2 Subtract 4.3 Intersect
5. Modification commands	5.1 Taper 5.2 Extrude 5.3 Delete 5.4 Copy 5.5 Colour
6. Figures	6.1 Arcs 6.2 Circles 6.3 Lines 6.4 2D and 3D polylines 6.5 Eclipses 6.6 Splines 6.7 Regions 6.8 Bodies 6.9 3D solid object

Curricular Content Guide

1. Underpinning Knowledge	1.1 Principles of solid primitives and extrude 1.2 Procedure of executing commands 1.3 Different methods to convert the object/drawing to Solid or Surface. 1.4 Method of editing solids 1.5 Differentiating edge effects or extract edges 1.6 Shading and rendering objects 1.7 Regenerating the 3D drawing in 3D view 1.8 Different composite functionsapplicable to solids 1.9 Method of thickening the solids. 1.10 Interference on solid objects.
2. Underpinning Skills	2.1 Launchingsolid primitives tab from 3D Modeling dropdown

	option of solids panel 2.2 Converting figures to a solid with a rectangular profile using "Polysolid" command 2.3 Creating unique solid primitives by extruding existing two-dimensional objects using "Extrude" command with Taper and Path 2.4 Executingcommands on solids 2.5 Converting polylines and circles to 3D solids using "convtosolid" command 2.6 Editing existing solids using solid editing commands 2.7 Extracting Edges of a 3D object using "_xedges" command 2.8 Adjusting the smoothness of shaded and rendered objects using "FACETRES" command with valid values range. 2.9 Applying "ISOLINES" and "REGEN" command to regenerate the3D drawing in 3D view 2.10 Applying composite functions on solids; 2.11 Creating 3D solid by thickening a surface using "THICKEN"command. 2.12 Highlighting 3D solids that overlap using "INTERFERE" command.
3. Underpinning Attitudes	3.1 Cleanliness/tidiness 3.2 Commitment to occupational health and safety practices 3.3 Environmental concerns 3.4 Eagerness to learn 3.5 Timeliness and orderliness 3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Various Channels and cables 4.3 Personal computer/laptop 4.4 Auto CAD software 4.5 Work instruction sheet 4.6 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Launched solid primitives tab from 3D modeling dropdown option of solids panel. 1.2 Edited existing solids using solid editing commands 1.3 Applying "ISOLINES" and "REGEN" command to regenerate the 3D drawing in 3D view 1.4 Applied composite functions on solids 1.5 Created 3D solid by thickening a surface using "thicken"command.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration

	2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **MERGE FLAT OBJECTS FROM 3D MODEL**	**Nominal Duration:** 34hrs.	**Unit Code:** SEIP-CON-ACD-7-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required for a worker to merge flat objects from 3D model in the Civil Auto CAD Operation work. It specifically includes the tasks of Navigate sectioned objects and merging flat objects.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Navigate sectioned objects	1.1 Create section object that exposes the interior details of a model created with 3D objects using "SECTIONPLANE" command. 1.2 Apply following options to manipulate Section using **Grips.** 1.3 Apply following **commands** on Section. 1.4 Generate 2D and 3D Sections using option of right click button of mouse. 1.5 Use the intersection of plane and solids to create a region using "Section" command. 1.6 Apply "Slice" command on the 3D object.
2. Merge flat objects	2.1 Create 2D or "flattened" representation of all 3D objects in the current view using "flatshot' command. 2.2 Execute "SOLVIEW" command. 2.3 Generate profiles and sections in viewports created with SOLVIEW using "SOLDRAW" command. 2.4 Develop 3D view using UCS. 2.5 Run "SOLPROF" command.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. Grips	1.1 Base grip 1.2 Directional arrow grip 1.3 Segment end grip 1.4 Menu grip
2. Commands	1.1 Erase 1.2 Move 1.3 Copy 1.4 Scale 1.5 Rotate 1.6 Draw order

Curricular Content Guide

1. Underpinning Knowledge	1.1 Definition of section plane. 1.2 Dealing with sections 1.3 Generation of 2D and 3D sections 1.4 Section commands (slice, etc.) Definition 1.5 Method of label flat representation of the 3D objects 1.6 Recognition of 3D view using user coordinatesystem. 1.7 Configuration of solid profile
2. Underpinning Skills	2.1 Defining Section plane 2.2 Learning to deal with Sections. 2.3 Locating how to generate 2D and 3D Sections 2.4 Defining Section commands (Slice, etc.) 2.5 Labeling Flat representation of the 3D objects 2.6 Recognizing 3D view using user coordinate system. 2.7 Discovering Configuration of solid profile
3. Underpinning Attitudes	3.1 Cleanliness/tidiness 3.2 Commitment to occupational health and safety practices 3.3 Environmental concerns 3.4 Eagerness to learn 3.5 Timeliness and orderliness 3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Various Channels and cables 4.3 Personal computer/laptop 4.4 Auto CAD software 4.5 Work instruction sheet 4.6 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Defined section plane 1.2 Learnt to deal with sections. 1.3 Located how to generate 2D and 3D sections 1.4 Defined section commands (slice, etc.) 1.5 Labeled flat representation of the 3D objects 1.6 Recognized 3D view using user coordinate system. 1.7 Discovered configuration of solid profile
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **CUSTOMIZE RENDERING, MATERIALS AND LIGHTS**	**Nominal Duration:** 32 hrs.	**Unit Code:** SEIP-CON-ACD-8-O
Unit descriptor: This unit covers the knowledge, skills and attitudes required to customize rendering, materials and lightsin the civil Auto CAD operation work. It specifically includes the tasks of executing rendering, applying/configuring materials and applying lights.		

Elements and Performance Criteria Template:

(Terms in the performance criteria that are written in**bold and underlined**are described in the range of variables).

Elements of Competency	Performance Criteria
1. Execute rendering	1.1 Photorealistic or realistically shaded image of a three-dimensional wireframe or solid model using **"Render" commands** are Created. 1.2 Output site that the renderer uses to display the rendered image is determinedusing "RPERF" command and selecting "Destination". 1.3 Output quality that the renderer uses is determinedto display the rendered image using "RPERF" command and selecting "Quality level". 1.4 Parts of the model that gets processed during rendering is controledby following **three settings.** 1.5 **Other rendering commands** are performed.
2. Apply/configure materials	2.1 Material to drawing is addedusing "Materials" or "Marbrowseropen" commands. 2.2 Material layers are appliedusing "MATERIALATTACH". 2.3 Own material is create e.g. photo, Shapes. 2.4 Material mapping of photo or shapes is achievedusing "MATERIALMAP" command. 2.5 "Cutout materials" procedure is configured. 2.6 "Bump Map" option of the Material commandis applied. 2.7 "VSMATERIALMODE" command is executedto On/Off.
3. Apply lights	3.1 Default Lighting is turned On/Off using "DEFAULTLIGHTING" command. 3.2 Command "POINTLIGHT" that radiates light in all directions is executedfrom its location. 3.3 Command "SPOTLIGHT" that emits a directional cone of light is executed. 3.4 Lights in a drawing using "LIGHTLIST" commandis modified. 3.5 **Photometric** is customized. 3.6 The available functionality of lights tool palette is appliedby pressing CTRL+3. SUNPROPERTIES' command.

	3.7 Uniform parallel light ray isdisplayedin one direction only, using "DISTANTLIGHT" command. 3.8 Natural light is incorporatedinto the drawing by specifying the latitude and longitude of a location for the sunlight using "GEOGRAPHICLOCATION" command. 3.9 Sun properties areadjustedusing the "SUNPROPERTIES" command.

Range of Variables

Variable	**Range** (Includes but not limited to):
1. "Render" commands.	1.1 Destination 1.2 Quality 1.3 Selection 1.4 Crop 1.5 File.
2. Three settings.	2.1 View 2.2 Crop 2.3 Selected
3. Other rendering commands	3.1 "RPERF" 3.2 "RENDERENVIRONMENT" 3.3 "View" 3.4 "New" 3.5 "Diagnostic" and "Processing"
4. Photometric	4.1 Light energy 4.2 Light for lighting units 4.3 Luminaries 4.4 Weblight 4.5 Halogen effect 4.6 Candela intensity, etc

Curricular Content Guide

1. Underpinning Knowledge	1.1 Render command 1.2 Environmental features 1.3 Advance features of rendering as sampling, shadow, ray tracing, illumination, diagnostic processing 1.4 Effects illuminate scene 1.5 "Diagnostic" and "processing" features 1.6 Different methods to add/edit materials to 3d drawings 1.7 Adjusting procedure of material scale/layer 1.8 Material mapping (photo, shapes) 1.9 Method of purging materials from objects 1.10 Categorizing point and spot lights 1.11 Lights tool palette 1.12 Geographic location settings for a particular object 1.13 Handling procedure of the sun properties for light issues

2. Underpinning Skills	2.1 Explaining render command 2.2 Recognizing environmental features 2.3 Explaining advance features of rendering as sampling, shadow, ray tracing, illumination, diagnostic processing 2.4 Defining how effects illuminate scene 2.5 Explaining “diagnostic” and “processing” features 2.6 Exploring different methods to add/edit materials to 3d drawings 2.7 Defining how to adjust material scale/layer 2.8 Understanding the material mapping (photo, shapes) 2.9 Explaining how to purge materials from objects 2.10 Categorizing point and spot lights 2.11 Understanding lights tool palette 2.12 Describing geographic location settings for a particular object 2.13 Observing how to handle the sun properties for light issues
3. Underpinning Attitudes	3.1 Cleanliness/tidiness 3.2 Commitment to occupational health and safety practices 3.3 Environmental concerns 3.4 Eagerness to learn 3.5 Timeliness and orderliness 3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Personal computer/laptop 4.3 Auto CAD software 4.4 Work instruction sheet 4.5 Worksheets/Instruction sheet

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Describedgeographic location settings for a particular object 1.2 Executed rendering 1.3 Explained “diagnostic” and “processing” features 1.4 Applied/configured materials 1.5 Explained how to purge materials from objects. 1.6 Applied lights
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

End of Competency Standard

Assessment Guide

A Framework for Effective Assessment

Civil Auto CAD (2D & 3D) Operation

How to Use this Assessment Guide

- This Assessment Guide presents need-to-know information for Assessors and others who want to know more about the assessment process. A handy Table of Contents Guide on the next page shows you where to look.

- If you want the basics of assessment, its key terms and definitions, in a Question & Answer (Q&A) format, see Section One.

- If you want a knowledge of who does what, the key roles and responsibilities involved in assessment, see Section Two.

- If you want a “toolbox” of tools and templates, that you can select from depending on your assessment need, see Section Three.

- If you want to look at working samples of completed assessment tools, see the Appendices.

Table of Contents

Section One: Q&A linked to Key Terms & Definitions

1.25 Define the term “evidence gathering tools” giving examples
1.26 Define the term “portfolio.”
1.27 Outline a 6-step method for preparing an evidence plan.

1.28 Outline the steps (sequence of activities) involved in developing an assessment tool.
1.29 Describe the four dimensions of competency.

Section Two: Roles and Responsibilities

Page No.

Section Three: Tools and Templates

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Assessment Guide

Section One: Objectives linked to Key Terms & Definitions

Define assessment.

Assessment is a systematic process of collecting proof or evidence on whether or not a candidate has demonstrated competence in the performance of a work-related activity/task that is directly linked to a performance standard. The assessment confirms that the individual can perform to the standard expected in the workplace and/or the nationally approved competency standard.

Give an example of assessment.

A helpful example in this regard is the driving test. The driver must prove his competence to drive by demonstrating to the driving assessor his ability to do so. The driving assessor uses a checklist to assess the candidate and make the necessary recommendations, based on the evidence he has collected in observing the candidate's driving. S/He either records/recommends that the candidate is ***competent*** or ***not yet competent.***

What is the purpose of assessment?

The Purpose of Assessment is to confirm that a trainee can perform competently to the standards expected in the workplace.

What is Assessment based on?

- An effective Assessment is based on a Competency Standard.
- A Competency Standard describes the skills, knowledge, and attitudes needed to perform effectively in the workplace, not the classroom.

Define the term "competency."

Competency is the ability to do a task successfully. Aspects of competency include:

- The capacity to perform tasks to the required standard consistently
- The ability to respond to different needs in the workplace
- The ability to plan and integrate a variety of tasks to attain a work outcome

Describe what makes up a competency standard.

It must be noted that a competency standard is made up of individual units of competency that include elements of competency as well as the performance criteria needed to accomplish them.

Define the term "Assessment tool."

An assessment tool is, in effect, an evidence-gathering tool. It contains both the instrument used for the assessment and instructions for gathering evidence in the assessment process. As an assessment instrument it contains the context and conditions for the assessment; tasks to be administered to the learner; an outline of the evidence to be gathered for the learner; the criteria for judging the evidence; and the necessary housekeeping records for recording and reporting requirements.

Describe the difference between Conventional Testing & Competency Based Assessment.

Conventional Testing	CBT Assessment
• Emphasis on knowledge/memorization • Teachers/Training Providers have main role • Theory & practical Tests can become outdated • High cost & central control • Relatively inflexible	• Based on competency standards • Involve industry partners in crucial role • Assessment based on demonstration of work skills rather than classroom knowledge • Flexible delivery • Competencies widely recognized

	• Guidelines & Templates used

Describe briefly what makes up an assessment system.

An Assessment System must be understood as a well-coordinated set of documented policies and procedures, including assessment materials and tools, that ensure assessments are consistently valid, reliable, flexible, fair, and safe.

Define the purpose of the Assessor role.

The role of Assessor is the heart and soul of effective competency based assessment. Without this pivotal role, determining the competency of the trainee is mere guesswork.

Note:

- The Industry Assessor will be asked to provide specs and practical demonstration tests from his workplace that will provide the evidence for determining competency.
- The importance of this input cannot be overemphasized for it best matches and tests the required performance criteria from the Standard.

Describe the basic questions that an Assessor must ask when planning an Assessment.

Planning an Assessment: What Needs to Happen?

- Determine which Units of Competency need to be assessed?
- Determine what Assessment Methods will be used?
- Determine what evidence-based tools (specs) need to be developed by the Assessor to guide the assessment?
- Determine how long it will take?
- Determine when the assessment will occur?
- Determine where the assessment will take place?
- Determine how it will be recorded?

Give some Assessor Requirements/Competencies.

Requirements/Competencies of an Assessor-

- The ability to use assessment tools to gather evidence effectively is essential, adjusting the language where necessary to reflect the language/literacy/numeracy levels of the workplace and not to exceed them in order to ensure learner understanding. This will also entail an ability to respond to learner needs such as responding to learner disability.

- The skill to develop specifications and practical tests, based on performance criteria, that provide evidence of competency that will fast track the assessment process.
- The ability to clearly demonstrate current industry skills and competencies relevant to the Standard.

- The Assessor is selected/appointed by Industry to act as an Assessor because of his proven competencies.
- Knows what needs to be done to assess the performance criteria
- Demonstrates a high level of expertise in the technical area to be examined
- Can provide constructive feedback

Define the challenges of the Assessor Role.

Assessor Role: Challenges

- Needs to be objective and unbiased
- Must have interpersonal skills to relax nervous candidates or deal with those who are aggressive or emotional
- Must have ability to deal with those who have literacy problems or difficult dialect

Review some basic need-to-know elements concerning assessment.

Assessment Basics: Need to Know Elements

- Assessment to be conducted by Industry Assessor selected by industry
- Industry assessor must be familiar with units of competency outlined in the course standards
- Industry Assessor should drafts specs that reflect industry requirements for trainees and that are based on critical aspects of competency

- Industry assessor is responsible for making final judgment of **competent** or **not yet competent**
- Trainer will assist industry assessor
- Trainees must demonstrate competence based on the units of competency outlined in the standards
- All resources related to units of competency must be made available prior to the assessment event, e.g., tools, equipment, materials

Describe the trainer's role in the assessment process.

The Trainer acts as a primary resource for the Assessor and acts as a Facilitator.

Trainer ensures:

- All industry required tools, equipment, and materials are available for the assessment
- The training venue is booked and has sufficient space for demonstrations/tasks
- That all logistics such as admission slips, signature sheets, and records are readily available for distribution and collection
- That all teaching materials and Standard documents and Assessment tools are ready for the Assessor

Discuss the importance of principles of assessment and what is involved.

Principles of Assessment Table

Key Principles	Relevance/Meaning
Valid	Ensures assessment aligned with the Unit of Competency and is based on evidence that shows the learner can demonstrate skills and knowledge in other similar contexts (workplace)
Reliable	Evidence presented for assessment is consistently interpreted regardless of the Assessor
Flexible	Assesses competencies held by the learner regardless of where they have been acquired; reflects the individual learner's needs
Fair	The individual learner's needs or disability is considered in the assessment process; the learner is provided with information about the assessment process and given the opportunity to challenge the result of the assessment if warranted

Safe	The assessor has inspected the venue for assessment and determined that it is safe for all involved and that emergency evacuations are in place if needed

Define the term "evidence."

Evidence is information that is gathered and matched against a Unit of Competency to provide proof of competency.

State the different forms of evidence that can be collected.

Different forms of evidence that can be collected are-

- **Direct** such as demonstration test, or observation of Candidate
- **Indirect** such as Candidate's self-assessment or third party reports such as an employer interview

Describe and outline what is involved in "rules of evidence" and why they are important.

Rules of Evidence Table

Rules of Evidence	Meaning
Valid	The assessor is given assurance that the learner possesses the skills, knowledge, and attitudes described in the Unit of Competency and related assessment requirements
Sufficient	The assessor is assured that the quality, quantity, and relevance of the evidence is sufficient to enable a judgment to be made on the learner's competency
Authentic	The assessor is assured that the evidence provided for assessment is the learner's own work
Current	The assessor is assured that the assessment evidence demonstrates current competency of the learner. This evidence must be from the present or very recent past.

Describe the purpose of evidence gathering tools.

The Purpose of evidence gathering tools are-

- To help candidates understand what is expected of them
- To provide a focus for the assessment
- To identify what is needed to verify competency

State the use of the evidence guide.

The evidence guide provides useful advice on Unit of Competency assessment and must be read in conjunction with the performance criteria, required underpinning skills/knowledge/attitudes, range statement, and the critical aspects of competency for the Standard.

State why assessment evidence is important.

Evidence is the information gathered that provides proof that the performance criteria of a unit of competency has been met. Evidence can take many forms:

- **Observation:** watching the trainee perform
- **Questioning:** asking the trainee questions
- **Demonstration of specific skills:** seeing how the trainee performs a procedure or creates a final product
- **Examining** previous work the trainee has done

Describe the kinds of Assessment Methods that can be used for Evidence gathering purposes.

Various kinds of Assessment Methods can be used for Evidence gathering purposes. A wide range of assessment methods are available for Evidence- gathering purposes. Assessment methods are not limited to those listed below. The greater the range of assessment methods applied, the better the accuracy of the assessment.

Assessment Methods Table

Methods	Examples
Direct Observation of Candidate	Actual real-time activities in the workplace Work activities in a simulated workplace/training center
Questioning	Written questions; interviews; self-evaluation with questions; verbal questioning; questionnaires
Evidence compiled by Candidate	Portfolio; collection of work samples; products with supporting documentation; logbooks; information about life experience
Methods	Examples
Review of Product	Work samples and products; products as a result of a demonstration test/spec
Third Party Feedback	Reports/testimonials from Employers and Supervisors; evidence of training; interviews with Employers and Supervisors

Advice to the Assessor: use these methods and examples as a means of making your assessment valid, reliable, flexible, fair, and safe.

Define the term "evidence gathering tools" and give some examples of these tools.

Evidence gathering tools are the actual instruments that the Assessor uses to collect evidence. Evidence may be collected through:

- Demonstration of work activity
- Observation Checklist
- Question List
- Third party reports e.g. supervisor to verify consistent performance
- Review of candidate's portfolio

- Verifying the Candidate's capacity to deal with contingencies (unexpected things that come up)
- Written test

Define the term "portfolio."

A collection of evidence that may be presented by the Candidate to an Assessor to prove the Candidate's competence at a job or task.

What are some examples of Portfolio Evidence?

- Training results and certificates
- Training workbooks
- References from employers
- Job description and work experience
- Photos and videos
- Work journals
- Awards
- Work samples
- Letters and memos

Outline a 6-step method for preparing an evidence plan.

Steps in Preparing an Evidence Plan (Sequence of Steps to Follow)-

The Evidence Plan is the most important planning tool for an Assessor. A good evidence plan generates a list of the evidence that the Assessor must gather when conducting the assessment for a specific Unit of Competency. The following 6-Point Method for preparing an Evidence Plan provides a useful sequence of inter-related steps to follow:

1. Select Unit of Competency for assessment
2. Read full Unit of Competency
3. Identify evidence requirements based on:
    a. Elements and Performance Criteria
    b. Dimensions of Competence
    c. Underpinning skills knowledge
    d. Critical aspects of competency
4. Develop a list of evidence requirements
5. Identify best ways of collecting evidence (tools)
6. Document evidence plan

Outline the steps (sequence of activities) involved in developing an assessment tool.

Following are the steps (sequence of activities) involved in developing an assessment tool:

1. Select the Unit of Competency
2. Read the Unit of Competency
3. Identify the required evidence: critical aspects of competency
4. Identify the evidence gathering method
5. Complete the evidence plan
6. Select the appropriate template
7. Complete the template
8. Check the evidence gathering tools against the evidence plan and Unit of Competency
9. Check the tool with another Assessor for his opinion

Describe the four dimensions of competency.

Task Skills: the capacity to perform tasks in the workplace and demonstrate competence that meets the required Standard;

Task Management Skills: the ability to plan and integrate several tasks simultaneously that achieve a desired work outcome such as those skills involved in budgeting for a work operation, securing supplies and equipment for the work operation, completing the task in a timely, cost-effective manner, and ensuring safety practices are followed throughout;

Contingency Management Skills: the ability to respond to crises and breakdowns in the workplace, such as accidents and emergency situations that are unanticipated and require immediate action and resolution;

Job/Role Environment Skills: the capacity to own the responsibilities and expectations of the work environment that involves working with others effectively and participating in creating a work culture where all can contribute their best within the parameters of their job role

Assessment Guidelines

Section Two: Roles and Responsibilities

The Assessment System: Planning Guide for the Assessor

An Assessment System must be understood as a well-coordinated set of documented policies and procedures, including assessment materials and tools, that ensure assessments are consistently valid, reliable, flexible, fair, and safe.

Competency Assessment is a systematic process of collecting proof or evidence on whether or not a candidate has demonstrated competence in the performance of a work-related activity/task that is directly linked to a performance standard. The assessment confirms that the individual can perform to the standard expected in the workplace and/or the nationally approved competency standard.

Each **Unit of Competency** contained in a Standard describes a distinct part of a Mason's work and job profile. Within each Unit of Competency, the following components appear:

- Unit Title
- Unit Descriptor
- Elements of Competency
- Performance Criteria
- Range of Variables
- Evidence Guide

As a prelude to conducting assessments, the Assessor must be thoroughly familiar with all of the particulars and details of the Unit of Competency that is being assessed. This is a "must" for the role of the Assessor. He must be especially familiar with the Evidence Guide for gathering critical information.

The three sample assessment tools found below focus on the critical aspects of competency that can provide the required evidence to determine competency- the evidence guide. These sample assessment tools are as follows:

- Demonstration Checklist
- Observation Checklist
- Oral Questions Checklist

The duties of the Assessor include:

- Covering all of the key elements of the Unit of Competency under assessment
- Applying rigorously the Evidence Guide for the Unit of Competency as this contains the method and context of assessment, resources required for the assessment, the critical aspects of competency, and the required underpinning knowledge, skills, and attitudes
- Developing specifications (specs) for the task sheet for Demonstration as required
- Requiring the candidate to perform project tasks that cover interrelated units of competency- known as a "clustering."
- Making what can be termed "reasonable adjustments" for candidates with disabilities or for example, those candidates with regional dialects that prove difficult to understand

Note: These "reasonable adjustments" may involve reconfiguring a simulated workplace site so that a candidate's disability does not impede the assessment process, or for example, finding someone who can understand a regional dialect and assist the Assessor with essential communication skills.

Roles and Responsibilities of Assessor

Prior to any assessment, the Assessor should follow the specific instructions below to ensure a well-planned assessment event. In most cases s/he will be assisted by a Trainer. Nevertheless, s/he should make certain that good preparation has taken place for the assessment event.

1. Visit the assessment venue or workplace to ensure an adequate work area or platform containing:

- Sufficient space for working- ensure square meters of work space enough for task to be carried out effectively and safely
- Fire extinguisher and safety equipment within reach
- Emergency procedures in place
- All necessary tools, equipment, and materials ready at hand
- All necessary machinery in good working order

2. Assessment is drawn and extracted from the relevant Unit of Competency based on an approved Standard and on an Evidence plan that clearly focuses on critical aspects of competency.

3. The duration of time to assess the demonstration is clearly indicated, for example, 3 hours. This information is shared with the Candidate along with other pertinent

information such as the sequence of tasks that he must follow, and the fact that he will be closely observed as the tasks are performed.

4. After the Candidate has performed the task, the Assessor will provide feedback to the Candidate on his performance.

5. The responsibility on finally deciding whether or not the Candidate was Competent or Not Yet Competent belongs to the accredited Assessor.

6. At the conclusion of the assessment, the Assessor will provide feedback on whether or not the Candidate was Competent or Not Yet Competent. S/He will also share information on next steps. These next steps include where to obtain the certificate related to the assessment or, if unsuccessful, how to re-try for competency within a specified period of time.

Roles and Responsibilities of Trainer

Prior to the assessment, you will have studied and become familiar with the Competency Standard for the industry occupation. You will also have met with or contacted the Assessor beforehand and discussed preparations and arrangements for the assessment. Your role will be to facilitate the assessment process and ensure all necessary resources are available, assisting the Assessor wherever possible. For example, once a draft spec has been produced by the Assessor, you will ensure it is fully consistent with the evidence plan and copied appropriately for use by both the Assessor and Candidate.

In addition to a confirming a suitable training venue and time, you will ensure that:

- Sufficient space is allotted for task work- square meters of work space enough for demonstration tasks to be carried out effectively and safely
- Fire extinguisher and safety equipment within reach if necessary
- Emergency procedures in place
- All necessary tools, equipment, and materials ready at hand
- All necessary machinery in good working order

Your duties include:

- **notifying** the Assessor and candidates of planned assessment events and their location
- **advising and assisting** the Assessor on planned assessment events
- **collecting** admission slips and signature sheets for assessment events
- **ensuring** all required forms and reporting mechanisms are in place and ready for distribution to the Assessor and to the Candidate
- **ensuring** all requisite forms are duly signed and forwarded to the SEIP Office, or certifying body

- **responding** to candidate queries and concerns such as re-assessment procedures
- **reconfiguring** workplace simulations so that candidates with disabilities are able to participate fully and without impediment
- **working** closely with the SEIP contact to ensure a successful assessment event

Roles and Responsibilities of Candidate

Prior to the assessment, you will have studied and become familiar with the Competency Standard for your industry.

1. Initially, you will be given information on the task you are to perform, and the estimated time you will require to perform it. These tasks are based on the critical aspects of competency related to the performance criteria within the approved Competency Standard.

Given the necessary instructions, and/or a task-related spec and the necessary tools, materials, and equipment, you will carry out and complete a work task. You will observe that there is:

- Sufficient space for working- square meters of work space enough for task to be carried out effectively and safely
- Fire extinguisher and safety equipment within reach if necessary
- Emergency procedures in place
- All necessary tools, equipment, and materials ready at hand
- All necessary machinery in good working order

2. Assessment is drawn and extracted from the relevant Unit of Competency based on the approved Competency Standard and on an Evidence plan (proof of competence) developed by the Assessor that clearly focuses on critical aspects of competency. The Evidence plan will be based on critical assessment tools such as demonstration/task; observation; oral questions.

3. The duration of time to assess the demonstration should be clearly indicated, for example, 3 hours. This information will be given to you along with other pertinent information such as the procedure or sequence of tasks that you must follow. It is important to note that you will be closely observed and assessed throughout the duration of your demonstration. You will be given time to ask questions and request clarification. You will also be given 10 minutes to familiarize yourself with the resources to be used in the assessment.

4. Based on your performance in demonstrating the task, you will be assessed by the Assessor to be Competent or Not Yet Competent. Regardless of the result you will be given feedback from the Assessor on your performance and the next steps.

5. After you have performed the task, the Assessor will provide feedback to you on your performance.

6. The responsibility on finally deciding whether or not you are Competent or Not Yet Competent belongs to the accredited Assessor.

7. At the conclusion of the assessment, the Assessor will provide feedback on whether or not you have been assessed to be **Competent** or **Not Yet Competent**. Both your signatures will be required on the Assessment Form. You will also be allowed to make comments on the Assessor's decision. The Assessor will then share information on next steps. These next steps include where to obtain the certificate related to the successful assessment or, if unsuccessful, how to re-try for competency within a specified period of time.

Section Three: Tools and Templates

This toolbox of Tools and Templates offers a wide range of assessment tools that will facilitate evidence gathering and other assessment-related needs. Evidence gathering, however, should not be limited to these tools and templates alone. The toolbox should be revised or expanded as necessary, to include other tools and templates that are deemed relevant.

- Demonstration Checklist
- Observation Checklist
- Oral Questions Checklist
- Evidence Plan (Overall Summary)
- Assessor Job Sheet and Specifications (Spec) Form
- Competency Assessment Results
- Assessor Planning Checklist Tool
- All About Questioning Techniques for Use in Assessment
- Quick Guide to Conducting Competency Assessments
- Assessor's Quick Start

Demonstration Checklist

Candidate's name:	
Assessor's name:	
Qualification:	
Project-Based Assessment Title	
Units of competency covered:	
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐

Observation Checklist

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:			
Code:			
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist

Candidate's name:	
Assessor's name	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	
Reference Standard:	

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for competent/non yet competent.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	YES	NO
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Feedback to Candidate:

Candidate's overall performance was (circle):	Satisfactory	Not Satisfactory
The Candidate's underpinning knowledge was (circle):	Satisfactory	Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

EVIDENCE PLAN: Overall Summary

QUALIFICATION:	
Project-Based Assessment Title	
Units of competency covered	

Ways in which evidence will be collected: [tick the column] The evidence must show that the candidate …..	Observation with Questioning	Demonstration with Questioning	Written Examination	Portfolio
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				

Assessor Job Sheet and Specifications (Spec) Form

This Spec is in reference to the_____ Standard, and has been developed by an Industry Representative/Assessor.

The Result* indicates either C for Competent, or NYC for Not Yet Competent.

Unit of Competency	Elements Reviewed	Critical Aspects of Competency Covered	Result*: C/NYC

JOB #1 Procedure for Developing Specification (Spec): List the steps involved in performing the task/spec successfully. It will cover, in logical order, the critical aspects of competency listed above that will determine if the candidate is **Competent** or **Not Yet Competent.**

1.	
2.	
3.	
4.	
5.	

Tools and Equipment Required for Spec completion: List all tools, equipment, and materials required in completing Job #1:

Tools	Equipment	Materials

Assessor Name: Date:

Competency Assessment Results

Candidate's name:	
Assessor's name	
Qualification Title:	
Date of Assessment:	
Assessment Venue:	
Reference Standard:	
Unit of Competency:	

Assessment Unit	Competent	Not Yet Competent

Assessor's Recommendation and Comments:

Overall Assessment:

Yes: The Candidate successfully met the required evidence/standards and demonstrated all of the competencies necessary for certification in the Qualification and Units of Competency listed above.

No: The Candidate did not meet the evidence requirements. Re-assessment is recommended.

Assessor Signature:	Date:
Candidate Signature:	Date:
Assessment Center Manager Signature:	

ASSESSMENT PLANNING CHECKLIST TOOL

Assessor's name:	
Date:	

Directions: Circle the 'Yes' or 'No' response to each item.

1.	The Assessor is familiar with the unit(s) of competency being assessed	Yes	No
2.	The Assessor has verified that the workplace or training center has the correct equipment, machinery, tools, and materials necessary to complete all of the relevant aspects of the unit of competency	Yes	No
3.	The Assessor has ensured that all materials and equipment were assembled and arranged in advance.	Yes	No
4.	The Assessor has all the necessary tools, templates, and specifications needed to assess the trainee including a variety of assessment tools covering practical demonstration, observation, oral question, and (where necessary) written tests relevant to the competency specified in the standard	Yes	No
5.	The Assessor has met with the trainer prior to the assessment event to discuss his/her role.	Yes	No
6.	The Assessor will discuss the performance test with the trainee and address any concerns prior to giving the test	Yes	No
7.	The Assessor will discuss and record with the trainee the results of their performance	Yes	No

Action to be taken on "No" responses:

General Guidelines for Effective Questioning

- Keep questions short and focused on one key concept
- Ensure that questions are structured
- Test the questions to check that they are not ambiguous
- Use `open-ended questions such as `what if...?' and `why...?' questions, rather than closed questions
- Keep questions clear and straight forward and ask one at a time
- Use words that the candidate is able to understand
- Look at the candidate when asking questions
- Check to ensure that the candidate fully understands the questions
- Ask the candidate to clarify or re-phrase their answer if the assessor does not understand the initial response
- Confirm the candidate's response by repeating the answer back in his/her own words
- Encourage a conversational approach with the candidate when appropriate, to put him or her at ease
- Use questions or statements as prompts for keeping focused on the purpose of the questions and the kind of evidence being collected
- Use language at a suitable level for the candidate
- Listen carefully to the answers for opportunities to find unexpected evidence
- Follow up responses with further questions, if useful, to draw out more evidence or to make links between knowledge areas
- Compile a list of acceptable responses to ensure reliability of assessments

Recording responses

When using oral questioning, you may need a tool that has a structured approach (see below) and also enables you to record a candidate's responses. If the candidate's response is insufficient the assessor should record why on the recording sheet or checklist. This provides information that can be used later, if necessary, to explain to the candidate where he or she needs to develop their skills and/or knowledge to achieve the required competence.

Recording sheet for oral questioning (template)

Candidate's Name		
Assessor or Observer's Name		
Unit of Competency)		
Code		
Date of Assessment		
Location		
Task/Procedure		
Questions to be Answered by candidate	Response/Answer*	Satisfactory (Yes/No)
What would you do if …		
What would you do if …		
What would you do if …		
How do you …		
What are …		
Why did you… (Clarification)		
Follow up Questions		
The candidate's knowledge was:	Satisfactory Unsatisfactory	
Feedback to candidate:		
Candidate signature:	Date:	
Assessor/Observer's Signature:	Date:	

ASSESSOR GUIDE TO CONDUCTING COMPETENCY ASSESSMENTS

1. BEFORE THE ASSESSMENT	2. DAY OF ASSESSMENT	3. DURING THE ASSESSMENT	4. POST ASSESSMENT
- Review unit(s) of competency to be assessed especially evidence to be collected against performance criteria - Ensure the workplace or training center complies with all safety requirements and that high risk areas are clearly marked - Identify/request essential assessment resources: • tools and equipment • supplies and materials • personal protective equipment • print resources and rating sheets • Have trainees contacted if they have to bring any resources for the assessment, e.g. logbook	-Verify attendance through signed attendance sheet - Provide overview of what is to happen throughout day Orient the trainees to: • purpose of assessment • qualification to be assessed • assessment procedures to be followed • address needs of trainees and provide information on evidence requirements and assessment process • make all announcements just before start of assessment	Give clear instructions to trainees on what they are required to do: • time limits and expectations • all equipment and tools must be of the same quality for all trainees • written and verbal instructions translated into local dialects as needed • encourage questions • avoid providing any assistance to trainees during assessment • stop process if accident imminent • keep focused on evidence being valid, reliable, fair, flexible, and safe • Record details of evidence collected	Provide feedback on outcome of assessment process re: • give clear feedback on assessment decision • provide information on overcoming any gaps in competency assessment • provide opportunity to discuss assessment process and outcome **Prepare required assessment reports:** • all rating sheets signed by trainee as well as Assessor • maintain records of assessment procedures, evidence collected, and assessment outcome • verify assessment results/outcomes with training center **Prepare** recommendations for issuance of national certificate

Assessor's Quick Start

1. Identify the Unit(s) of Competency from the Program Standard that you are going to assess.

2. Review the Critical Aspects of Competency from the Unit of Competency that will be the basis of your Evidence Guide.

3. Select the Assessment Tools that you will use to gather evidence.
    i. Demonstration Checklist
    ii. Observation Checklist
    iii. Oral Questions Checklist

4. Create spec sheet(s) for the Unit of Competency to be examined.

5. Review the assessment procedure with the Candidate and ask if there are any questions.

6. Complete the assessment using the assessment tools in the order above. You are free to use other tools as well if you wish.

7. Determine whether Candidate is **Competent** or **Not-Yet-Competent**

8. Complete all necessary record sheets.

9. Give feedback to the Candidate.

Demonstration Checklist: Perform Auto Cad 2D Fundamentals

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Perform Auto Cad 2D Fundamentals
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Operate the AutoCAD visual reference commands.	☐	☐	☐
2. Execute line commands.	☐	☐	☐
3. Use circle commands.	☐	☐	☐
4. Recognize the AutoCAD pan realtime option.	☐	☐	☐
5. Create basic drawings in 2D.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Perform Auto Cad 2D Fundamentals

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:	Perform Auto Cad 2D Fundamentals		
Code:	SEIP-CON-ACD-1-0		
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1. Operate the AutoCAD visual reference commands.			
2. Execute line commands.			
3. Use circle commands.			
4. Recognize the AutoCAD pan realtime option.			
5. Create basic drawings in 2D.			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist: Perform Auto Cad 2D Fundamentals

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Perform Auto Cad 2D Fundamentals
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. Can you identify 5 visual reference commands?		
2. Can you define 10 line commands?		
3. Can you identify 10 circle commands?		
4. How can you demonstrate recognition of the Auto CAD Pan real time option?		
5. Can you create three basic drawings in 2D to the satisfaction of the Assessor?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Create 3D Interface Drawings

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Create 3D Interface Drawings
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Execute the steps required to apply 3D modelling panels.	☐	☐	☐
2. Identify options on 3D modelling pull down menus to the satisfaction of the Assessor.	☐	☐	☐
3. Apply thickness command at command prompt with different values.	☐	☐	☐
4. Execute the "Elev" command and prompt with different values.	☐	☐	☐
5. Apply different visual functions.	☐	☐	☐
6. Draw 3D user and Z Cartesian (X,Y,Z) coordinates system.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Create 3D Interface Drawings

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Create 3D Interface Drawings
Code:	SEIP-CON-ACD-2-0
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1. Execute the steps required to apply 3D modelling panels.		
2. Identify options on 3D modelling pull down menus to the satisfaction of the Assessor.		
3. Apply thickness command at command prompt with different values.		
4. Execute the "Elev" command and prompt with different values.		
5. Apply different visual functions.		
6. Draw 3D user and Z Cartesian (X,Y,Z) coordinates system.		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		
Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Create 3D Interface Drawings

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Create 3D Interface Drawings
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. Can you describe how to modify the general properties of an object?		
2. Can you briefly describe the User Coordinates System (UCS) command with multiple switches and how applied?		
3. Can you describe at least 7 different styles?		
4. Can you review the purpose of the 3D Modelling pull down menus?		
5. To what extent is are different viewport options important and why?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Draw 3D Orbit Navigations And Model

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Draw 3D Orbit Navigations And Model
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Define 3D orbit in various commands.	☐	☐	☐
2. Set 3D view while in the orbit command using pre-set views.	☐	☐	☐
3. Execute "ANIPATH" command for animation path.	☐	☐	☐
4. Combine different simple shapes to create more complex solids.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Draw 3D Orbit Navigations And Model

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Draw 3D Orbit Navigations And Model
Code:	SEIP-CON-ACD-3-0
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1. Define 3D orbit in various commands.		
2. Set 3D view while in the orbit command using pre-set views.		
3. Execute "ANIPATH" command for animation path.		
4. Combine different simple shapes to create more complex solids.		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		
Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Draw 3D Orbit Navigations And Model

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Draw 3D Orbit Navigations And Model
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. What is involved in performing 3D dimensional navigation?		
2. Can you identify at least 7 camera functions?		
3. Can you briefly describe what is involved in operating a 3D object?		
4. What is the purpose of the "ANIPATH" command?		
5. To what extent is the ability to work as a team member important in AutoCAD work?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Produce 2D Solid And 3D Faces

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Produce 2D Solid And 3D Faces
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Create a three-dimensional polyface mesh vortex using "PFACE" command and pick points.	☐	☐	☐
2. Execute the "edge" command.	☐	☐	☐
3. Draw 3D faces with invisible edges.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Produce 2D Solid And 3D Faces

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:	Produce 2D Solid And 3D Faces		
Code:	SEIP-CON-ACD-4-0		
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1. Create a three-dimensional polyface mesh vortex using "PFACE" command and pick points.			
2. Execute the "edge" command.			
3. Draw 3D faces with invisible edges.			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist: Produce 2D Solid And 3D Faces

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Produce 2D Solid And 3D Faces
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. What is the procedure used for drawing 3D faces with invisible edges?		
2. To what extent is a concern for work quality important?		
3. Can you briefly describe the purpose of the "EDGE" command?		
4. What method is used for creating solid-filled triangles and quadrilaterals?		
5. To what extent and why is occupational health and safety important?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Insert Surfaces

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Insert Surfaces
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Use mesh editing commands to enable mesh editing.	☐	☐	☐
2. Develop surfaces using identified surface commands.	☐	☐	☐
3. Use editing commands to edit existing surfaces.	☐	☐	☐
4. Use surface analysis tools.	☐	☐	☐
5. Create complex 3D surfaces.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Insert Surfaces

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:	Insert Surfaces		
Code:	SEIP-CON-ACD-5-0		
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1. Use mesh editing commands to enable mesh editing.			
2. Develop surfaces using identified surface commands.			
3. Use editing commands to edit existing surfaces.			
4. Use surface analysis tools.			
5. Create complex 3D surfaces			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist: Insert Surfaces

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Insert Surfaces
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. Where is the mesh tab located?		
2. What is the purpose of mesh commands?		
3. How are complex 3D surfaces created?		
4. What is the function of Mesh Crease commands?		
5. To what extent is orderliness important in AutoCAD work?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Develop Solid Images

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Develop Solid Images
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Launch solid primitives tab from 3D modelling dropdown option of solids panel.	☐	☐	☐
2. Edit existing solids using solid editing commands.	☐	☐	☐
3. Apply "ISOLINES" and "REGEN" command to regenerate the 3D drawing in 3D view.	☐	☐	☐
4. Apply composite functions on solids.	☐	☐	☐
5. Create 3D solid by thickening a surface using "thicken" command.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Develop Solid Images

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:	Develop Solid Images		
Code:	SEIP-CON-ACD-6-0		
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1. Launch solid primitives tab from 3D modelling dropdown option of solids panel.			
2. Edit existing solids using solid editing commands.			
3. Apply "ISOLINES" and "REGEN" command to regenerate the 3D drawing in 3D view.			
4. Apply composite functions on solids.			
5. Create 3D solid by thickening a surface using "thicken" command.			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist: Develop Solid Images

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Develop Solid Images
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. How is a 3D solid created?		
2. What are 5 common modification commands?		
3. Can you identify 6 solid editing commands?		
4. What is involved in the shading and rendering of objects?		
5. What is involved in editing 3D objects?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Merge Flat Objects From 3D Model

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Merge Flat Objects From 3D Model
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Define section plane.	☐	☐	☐
2. Identify the procedure for dealing with sections.	☐	☐	☐
3. Determine how to generate 2D and 3D sections.	☐	☐	☐
4. Define section commands (slice, etc.)	☐	☐	☐
5. Label flat representation of 3D objects	☐	☐	☐
6. Identify 3D view using user coordinate system.	☐	☐	☐
7. Implement configuration of solid profile.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Merge Flat Objects From 3D Model

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:	Merge Flat Objects From 3D Model		
Code:	SEIP-CON-ACD-7-0		
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1. Define section plane.			
2. Identify the procedure for dealing with sections.			
3. Determine how to generate 2D and 3D sections.			
4. Define section commands (slice, etc.)			
5. Label flat representation of 3D objects.			
6. Identify 3D view using user coordinate system.			
7. Implement configuration of solid profile.			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist: Merge Flat Objects From 3D Model

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Merge Flat Objects From 3D Model
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. Can you briefly describe the procedure for merging flat objects?		
2. Can you describe the procedure for dealing with sections?		
3. How easy is it to navigate sectioned objects?		
4. What is the purpose of the "flatshot" command?		
5. To what extent is communication important in AutoCAD work and why?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Customize Rendering Materials And Lights

Candidate's name:	
Assessor's name:	
Qualification:	Civil Auto CAD (2D & 3D)
Project-Based Assessment Title	
Units of competency covered:	Customize Rendering Materials And Lights
Date of assessment:	
Time of assessment:	

Instructions for demonstration	
Please see attached Instruction for Demonstration (Candidate/Assessor)	
Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Describe geographic location settings for a specified object.	☐	☐	☐
2. Execute rendering.	☐	☐	☐
3. Describe "diagnostic" and "processing" features.	☐	☐	☐
4. Apply/configure materials.	☐	☐	☐
5. Describe how to purge materials from objects.	☐	☐	☐
6. Apply lights.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Customize Rendering Materials And Lights

Candidate's name:			
Assessor's name:			
Date of Assessment:			
Unit of Competency:	Customize Rendering Materials And Lights		
Code:	SEIP-CON-ACD-7-0		
Name of Workplace/Training Center			
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided		
During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):			
		YES	**NO**
1. Describe geographic location settings for a specified object.			
2. Execute rendering.			
3. Describe "diagnostic" and "processing" features.			
4. Apply/configure materials.			
5. Describe how to purge materials from objects.			
6. Apply lights.			
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**	
Feedback to Candidate:			
Candidate's Signature:			Date:
Assessor's Signature:			Date:

Oral Questions Checklist: Customize Rendering Materials And Lights

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Customize Rendering Materials And Lights
Reference Standard:	**Civil Auto CAD (2D & 3D)**

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response

Indicate Y or N in the box provided	YES	NO
1. Can you describe a procedure for handling the sun properties for light issues?		
2. Can you outline a 5-step method for rendering?		
3. Can you describe a 7-step method for applying/configuring materials?		
4. Can you outline a procedure for applying lights?		
5. To what extent are environmental concerns of importance in this work?		

Feedback to Candidate:

The Candidate's overall performance was (circle): Satisfactory/ Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/ Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**