



education

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NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

ENGINEERING FABRICATION

NQF LEVEL 2

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SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Engineering Fabrication in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Engineering Fabrication* to prepare for and deliver Engineering Fabrication. Lecturers should use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
 - social adjustment and responsibility;
 - moral accountability and ethical work orientation;
 - economic participation; and
 - nation-building.

The principles that drive these objectives are:

- **Integration**

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- **Relevance**

To be dynamic and responsive to national development needs.

- **Credibility**

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- **Coherence**

To work within a consistent framework of principles and certification.

- **Flexibility**

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- **Participation**

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- **Access**

To address barriers to learning at each level to facilitate students' progress.

- **Progression**

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- **Portability**

To enable students to transfer credits of qualifications from one learning institution and/or employer to another institution or employer.

- **Articulation**

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- **Recognition of Prior Learning**

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- **Validity of assessments**

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

- clearly stating the outcome to be assessed;
- selecting the appropriate or suitable evidence;
- matching the evidence with a compatible or appropriate method of assessment; and
- selecting and constructing an instrument(s) of assessment.

- **Reliability**

To assure assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- **Fairness and transparency**

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

- Inequality of opportunities, resources or teaching and learning approaches
- Bias based on ethnicity, race, gender, age, disability or social class
- Lack of clarity regarding Learning Outcome being assessed
- Comparison of students' work with other students, based on learning styles and language

- **Practicability and cost-effectiveness**

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

2.1 Internal continuous assessment (ICASS)

Knowledge, skills values, and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a real workplace, a workshop or a "Structured Environment". This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

2.2 External summative assessment (ESASS)

The external summative assessment is either a single or a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

A compulsory component of external summative assessment (ESASS) is the **integrated summative assessment task (ISAT)**. This assessment task draws on the students' cumulative learning throughout the year. The task requires **integrated application of competence** and is executed under strict assessment conditions. The task should take place in a simulated or "Structured Environment". The integrated summative assessment task (ISAT) is the most significant test of students' ability to apply their acquired knowledge.

The integrated assessment approach allows students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

3 MODERATION OF ASSESSMENT

3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator's involvement starts with the planning of assessment methods and instruments and follows with continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assessor; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures for students who experience barriers to learning be customised and supported to enable these students to achieve their maximum potential.

4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational)*.

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be declared competent against the standards set by the ETDP SETA. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

LECTURER ASSESSMENT	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
SELF-ASSESSMENT	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
PEER ASSESSMENT	Students assess another student or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
GROUP ASSESSMENT	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's Portfolio of Evidence (PoE).

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	Task-based (Structured)	Test-based (More structured)
Assessment instruments	<ul style="list-style-type: none"> • Observation • Class questions • Lecturer, student, parent discussions 	<ul style="list-style-type: none"> • Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews 	<ul style="list-style-type: none"> • Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	<ul style="list-style-type: none"> • Observation sheets • Lecturer's notes • Comments 	<ul style="list-style-type: none"> • Checklists • Rating scales • Rubrics 	<ul style="list-style-type: none"> • Marks (e.g. %) • Rating scales (1-7)
Evidence	<ul style="list-style-type: none"> • Focus on individual students • Subjective evidence based on lecturer observations and impressions 	<p>Open middle: Students produce the same evidence but in different ways.</p> <p>Open end: Students use same process to achieve different results.</p>	Students answer the same questions in the same way, within the same time.

10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

Rating scales are marking systems where a symbol (such as 1 to 7) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong, weak or strong, etc.

Task lists and **checklists** show the student what needs to be done. They consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

Rubrics are a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. It is a different way of assessment and cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly, two types of rubrics, namely holistic and analytical, are used.

11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded determine which instrument will be used.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not simply be a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN ENGINEERING FABRICATION

1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 50 percent of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a Portfolio of Evidence (PoE) account for the other 50 percent.

The Portfolio of Evidence (PoE) and the external assessment include practical and written components. The practical assessment in Engineering Fabrication must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001)*.

2 RECORDING AND REPORTING

Engineering Fabrication, as is the case for all the other Vocational subjects, is assessed according to five levels of competence. The level descriptions are explained in the following table.

Scale of Achievement for the Vocational component

RATING CODE	RATING	MARKS %
5	Outstanding	80-100
4	Highly competent	70-79
3	Competent	50-69
2	Not yet competent	40-49
1	Not achieved	0-39

The programme of assessment should be recorded in the Lecturer's Portfolio of Assessment for each subject. The following should at least be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The college must standardise these documents.

The student's Portfolio of Evidence (PoE) must at least include:

- A contents page
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task

- A record of the marks (and comments) achieved for each task

Where tasks cannot be contained as evidence in the Portfolio of Evidence (PoE), its exact location must be recorded and it must be readily available for moderation purposes.

The following units guide internal assessment in Engineering Fabrication Level 2:

NUMBER OF UNITS	METHODOLOGY	COVERAGE
3	Formal written tests	All theoretical-oriented Subject Outcomes or topics
20	Practical demonstrations	Practically oriented Subject Outcomes
12	Drawing tasks	All drawing related Subject Outcomes
3	Drawing tests	

ASSESSMENT OF ENGINEERING FABRICATION LEVEL 2

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN ENGINEERING FABRICATION – LEVEL 2

Topic 1: Templating and Patternmaking

SUBJECT OUTCOME	
Explain the importance of templates in the fabrication process.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Definitions of a template given are clear, comprehensive and descriptive using correct terminologies and examples. Various types of templating material are correctly identified and the purpose of templates is explained. Identical templates are constructed with a 3-6mm variation in the accuracy to indicate how problems arise when in use. 	<ul style="list-style-type: none"> Explain what a template is. Understand how the wrong choice of material to make a template can affect the output. Explain the various uses of templates. Understand the importance of accuracy when templating.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Students draw three types of templates using the three methods learnt. A sketch of a 500 diameter pipe cut at an angle of 45° is given to students who must: <ul style="list-style-type: none"> Reproduce the sketch using a scale of 1:10. Use all competencies gained to reproduce the sketch. Apply the parallel line method to produce a developed pattern using all competencies gained. Students are given a sketch of a conical frustum cut at 180°. The vertical height of the cone is 250mm with a base diameter of 500mm. Students must reproduce the drawing using a scale of 1:15 and produce a template using the radial line method. 	

SUBJECT OUTCOME	
Demonstrate knowledge of patternmaking by applying development techniques.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Various patterned templates are discussed and described indicating the purpose of each and the type of fabrication process involved. A set of drawing symbols, a line thickness chart indicating types of line constructions, engineering symbols, etc. are discussed and correctly identified according to the job specifications. Basic parallel line, radial line and triangulated templates are produced according to the specifications and instructions given. 	<ul style="list-style-type: none"> Identify specific shapes of templates. Give detailed explanations and descriptions of correct drawing techniques. Demonstrate the making of each basic type of template using development techniques.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> A sketch of a square transition piece is handed out to students with the top 150mm and the base 250mm. Students use a suitable scale and reproduce the sketch. A patterned development using triangulation needs to be done. 	

SUBJECT OUTCOME	
Understand how scaling is used in templating.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Daily examples of scaling are given in relation to the physical world around us. Clear explanations indicating the definition of scale is given using scientific terminologies. Maps, drawings, sketches, models, etc. are used to illustrate scaling up or down. 	<ul style="list-style-type: none"> Explain what scale is and how it is used. Give examples of real-life situations where scaling is used. Clearly illustrate scale down and scale up definitions.

ASSESSMENT TASKS OR ACTIVITIES
Outcomes assessed in one fabricated model

SUBJECT OUTCOME	
Understand the tolerances used in making templates.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Identical templates made from thin and thick cardboard are used to understand the effects of tolerance and compensation. • Templates made from thin sheet metal are used to demonstrate different tolerance and compensation procedures. • Cardboard templates left in the sun and ones that have been wet are used to illustrate and understand how physiological and structural changes effect fabrication. 	<ul style="list-style-type: none"> • Explain the importance of tolerance in relation to the type of material used for templating. • Explain how thickness of the template affects the outcome of the job. • Understand the physiological and structural changes of a template in relation to its accurateness. • Explain the meaning of compensation.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

Topic 2: Principles and Techniques of Marking Off and Laying Out

SUBJECT OUTCOME	
Prepare for layout and marking off of materials under supervision.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • All potential hazards are identified and preventative action is taken in accordance with safety procedures. • Fabrication and assembly allowances are determined and calculated in accordance with worksite procedures. 	<ul style="list-style-type: none"> • Identify potential hazards before marking off begins. • Determine allowance for the marking-off and fabrication process. • Identify the materials and tools required for marking. • Determine which development method to use. • Determine datum points, gradients, angles and other criteria for making the template.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Students use the correctly developed templates from above activities for the tasks that follow. 	

SUBJECT OUTCOME	
Make and use templates.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Identification and selection of materials, tools and equipment and quantity estimation is performed according to job requirements. • Method of pattern development to be used is identified according to the specific job requirements. • All datum points, gradients, angles and pattern calculations are performed in accordance with the specifications and requirements of the job. • Template material is chosen according to its appropriateness to the job. • Wrap-around templates are produced according to the type of fabrication, product or component. • Structural detail templates are produced to suit job specifications. • Datum points are established and transferred in accordance with worksite procedures. 	<ul style="list-style-type: none"> • Choose the correct type of material to use for the template. • Establish datum points to begin the template. • Correctly mark and make structural detail templates according to specifications. • Produce wrap-around templates using the correct design, tolerance and fitment principles.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Mark out sections required for use.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Material is identified in accordance with job specifications. Sections are marked out in accordance with job specifications. Datum points are established, where required, to aid fabrication. 	<ul style="list-style-type: none"> Mark out the appropriate sections using the applied competences. Annotate on the template all the relevant details and its purpose during the fabrication process.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Mark out surface developments.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Material is identified according to job specifications. Surface to be developed is defined according to job specifications. Method of development is selected according to worksite procedures. Fabrication allowances are determined according to job specifications and are transferred to the pattern. Datum points are established and marked to aid fabrication. Marking out is carried out according to job specifications. 	<ul style="list-style-type: none"> Explain and identify the various surfaces to be templated. Prepare the surface to be templated by measuring, marking and keeping it free from scale and dust. Correctly identify the fabrication tolerances when using the template.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> A pre-rolled 500° 3mm thick mild steel pipe is cut into sections and handed to students. Students use the parallel line template and wrap it around the pipe. The surface development is marked off using all competencies gained. The template is removed and the work piece is ready for cutting. 	

Topic 3: Forming and Shaping Techniques

SUBJECT OUTCOME	
Prepare for forming and shaping of materials.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Material characteristics are determined with regard to forming and shaping according to job specifications. All calculations necessary for the fabrication process are checked and evaluated for correctness and appropriateness. 	<ul style="list-style-type: none"> Choose the correct types of material and tools for the process. Demonstrate the necessary calculations required for the process. Plan the sequence of operations carefully. Identify hazards before starting any operations.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Students use their templates made with the triangulation method for the next task. A 3mm square plate is used to mark off the plates required for the transition piece. The template is placed on the surface of the plate and it is marked off. It is placed aside ready for the cutting process 	

SUBJECT OUTCOME	
Perform forming and shaping of materials.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Machines for forming are set to achieve specified results according to job specifications. Materials are formed and shaped according to job specifications. 	<ul style="list-style-type: none"> Operate the necessary tools and equipment according to safe workshop practices. Form materials according to job specifications. Shape materials according to job specifications.

<ul style="list-style-type: none"> Materials are straightened according to job specifications. 	
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

Topic 4: Oxy-Acetylene Cutting

SUBJECT OUTCOME	
Describe the oxy-acetylene cutting process.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The importance of correctly setting cutting pressures and the consequences of incorrect settings are explained. The thickness of materials, size and type of cutting nozzles in relation to fuel gas used and the impact of cutting torch manipulation during the cutting process are explained. Basic and major components of the oxyfuel cutting process and equipment are identified and their function and purpose are correctly explained in terms of cutting standards. Consequences of incorrect start-up and shut-down procedures are explained. Cutting characteristics of low carbon steel are identified and the implications of unsafe conditions are described. Terms and definitions consistent with accepted cutting terminology as recorded in cutting standards are used. 	<ul style="list-style-type: none"> Correctly and comprehensively explain the terminologies associated with oxygen-acetylene gas cutting procedures. Identify the various cutting pressures and the correct nozzles associated with each in relation to the thickness of material (steel) being cut. Correctly explain the actual chemical and mechanical processes that take place during cutting. Carry out various pre-operational checks. Demonstrate start-up and shut-down procedures.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Students set up the cutting equipment correctly. (If anything is left out, they should be penalised and the lecturer should note this.) Before any cutting can take place, all students must be found competent in setting up cutting equipment. 	

SUBJECT OUTCOME	
Cut materials.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Cutting of material is carried out in accordance with work instruction sheet and drawing requirements. Safety precautions (applicable to the cutting process) are applied and adhered to according to the OHS Act. Apply quality check on cut materials. The product's conformance to specifications as reflected by the drawing or job requirements is inspected. <p><i>Defects include excessive slags, rough cutting surface, jagged edges, rounded top corner.</i> <i>Hazards include flashbacks.</i></p> <ul style="list-style-type: none"> Identify and correct cutting defects. 	<ul style="list-style-type: none"> Adhere to all safety precautions according to workshop requirements and the Occupational Health and Safety Act. Demonstrate the cutting operation using knowledge and skills attained. Apply quality checks to process.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Students use skills, knowledge and safety during cutting. The lecturer ensures that students use the correct posture and the all personal protective equipment (PPE) is correctly and appropriately worn. All cutting takes place in a controlled environment and the lecturer ensures the quality of cuts. 	

SUBJECT OUTCOME
Care for and store cutting equipment.

ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Explain care and storage procedures for tools and equipment in accordance with worksite practices and specifications. Oxyfuel cutting equipment is dismantled and stored according to the manufacturer's specifications and requirements. 	<ul style="list-style-type: none"> Explain care and storage procedures for tools and equipment according to worksite practices and specifications. Dismantle oxyfuel cutting equipment according to workshop procedures. Store cylinders, hoses, gauges and torch away neatly and safely in accordance with procedures.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

Topic 5: Power Machine Cutting

SUBJECT OUTCOME	
Prepare for mechanical cutting of materials under supervision.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Cutting machines and lubricants are identified and selected in accordance with worksite procedures. Material characteristics are verified with supervisor. Machines are inspected and checked in readiness to achieve job specifications. Machines are set and settings are verified according to job specifications. Potential hazards are identified and preventative action is taken according to worksite procedures. 	<ul style="list-style-type: none"> Identify cutting machines and lubricants used in the operation. Select the correct lubricant for the process and the correct personal protective equipment. Select the correct power tool and the correct blade, saw or cutter for the operation. Inspect the machine for safety hazards or mechanical inconsistencies. Adjust the settings to perform optimum cutting operations. Identify potential hazards that may render the operation unsafe. Explain the reason for maintaining correct posture while cutting.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> For materials that cannot be cut with via the oxy-acetylene process, the appropriate powered machinery may be used. 	

SUBJECT OUTCOME	
Perform mechanical cutting of materials under supervision.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Materials are cut according to job specifications. Blade clearances are confirmed to achieve shearing consistent with job specifications. Cut edges are checked to conform to job specifications or worksite procedures. 	<ul style="list-style-type: none"> Cut materials as required safely and accurately. Apply lubricants as and when required. Smooth out rough edges and burrs.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Students use skills, knowledge and safety during cutting. The lecturer ensures that students use the correct posture and the all personal protective equipment (PPE) is correctly and appropriately worn. All cutting takes place in a controlled environment and the lecturer ensures the quality of cuts. Students must use their knowledge to identify, select and use the correct cutting equipment for their requirements. 	

Topic 6: Fabrication of Components by Parallel Line Methods

SUBJECT OUTCOME	
Explain the factors critical to fabricating components using the parallel line method.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The reasons for using the parallel line method is explained according to specified requirements. A clear understanding of the direct consequences to 	<ul style="list-style-type: none"> Explain the parallel line method clearly, correctly and comprehensively. Identify potential error-causing factors and

<p>self and business are shown.</p> <ul style="list-style-type: none"> Possible workplace hazards that may be encountered while fabricating are listed and the risks associated with and the factors contributing to each work-related hazard are described. 	<p>compensate for them.</p> <ul style="list-style-type: none"> Identify the reason why no other method will work. Demonstrate the techniques involved in applying this method correctly.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Prepare to fabricate components.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Permission to enter the workplace is obtained in accordance with specified requirements. The required personal protective equipment is selected, examined and used in a way that is consistent with its purpose, design and specified requirements. PPE is used to ensure the safety of persons and equipment. Tools, materials and equipment are selected, examined and transported in accordance with specified requirements. The workplace is examined and all hazardous conditions are dealt with in accordance with specified requirements. The consequences on health, safety and production of not preparing by means of the parallel line are explained. 	<ul style="list-style-type: none"> Obtain the required permission or clearance to enter the work area. Demonstrate how personal protective equipment is worn correctly. Correctly select the tools and equipment required for fabrication. Check all lifting equipment that may be used for mechanical correctness and safety.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Fabricate the components.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The required personal protective equipment is selected, examined and used in a way that is consistent with its purpose, design and specified requirements. PPE is used to ensure the safety of persons and equipment. The job instructions are interpreted and the material is marked off in accordance with specified requirements. The components are fabricated according to specified requirements. Work-related hazards are dealt with in accordance with specified requirements. Interpersonal interaction is demonstrated to be positive, consistent with specified requirements, effective in terms of teamwork and conflict-free. Tools and equipment are used according to the manufacturer's design and without injury to self or others. Consequences on health, safety and production of not fabricating the components in line with specified requirements are explained. <p><i>Range: PPE, interpretation and marking-off, fabrication processes, hazards, interpersonal interaction, use of tools and equipment</i></p>	<ul style="list-style-type: none"> Examine workplace for safeness and cleanliness. Use the parallel line development method and mark out templates. Use templates to produce components. Place correct components with each other to produce the product. Constantly check for correctness by measuring the product and ensure specifications are adhered to. Complete the job by checking the quality of the product and maintaining safe and neat working standards.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

Topic 7: Fabrication of Components By Radial Line Methods

SUBJECT OUTCOME	
Explain the factors critical to fabricating components using the radial line method.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The reasons for using this method are explained according to specified requirements. A clear understanding of the direct consequences to self and business are shown. Possible workplace hazards that may be encountered while fabricating are listed and the risks associated with and the factors contributing to each work-related hazard are described. 	<ul style="list-style-type: none"> Explain the radial line method clearly, correctly and comprehensively. Identify potential error-causing factors and compensate for them. Identify the reason why no other method will work. Demonstrate the techniques involved in applying this method correctly.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Prepare to fabricate components.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Permission to enter the workplace is obtained in accordance with specified requirements. The required personal protective equipment is selected, examined and used in a way that is consistent with its purpose, design and specified requirements. PPE is used to ensure the safety of persons and equipment. Tools, materials and equipment are selected, examined and transported in accordance with specified requirements. The workplace is examined and all hazardous conditions are dealt with in accordance with specified requirements. The consequences on health, safety and production of not preparing by means of the radial line are explained. 	<ul style="list-style-type: none"> Obtain the required permission or clearance to enter the work area. Demonstrate how personal protective equipment is worn correctly. Correctly select the tools and equipment required for fabrication. Check all lifting equipment that may be used for mechanical correctness and safety.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Fabricate the components.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The required personal protective equipment is selected, examined and used in a way that is consistent with its purpose, design and specified requirements. PPE is used to ensure the safety of persons and equipment. The job instructions are interpreted and the material is marked off in accordance with specified requirements. The components are fabricated according to specified requirements. Work-related hazards are dealt with in accordance with specified requirements. Interpersonal interaction is demonstrated to be positive, consistent with specified requirements, effective in terms of teamwork and conflict-free. Tools and equipment are used according to the manufacturer's design and without injury to self or others. Consequences on health, safety and production of not 	<ul style="list-style-type: none"> Examine workplace for safeness and cleanliness. Use the radial line development method and mark out templates. Use templates to produce components. Place correct components with each other to produce the product. Constantly check for correctness by measuring the product and ensure specifications are adhered to. Complete the job by checking the quality of the product and maintaining safe and neat working standards.

fabricating the components in line with specified requirements are explained. <i>Range: PPE, interpretation and marking-off, fabrication processes, hazards, interpersonal interactions, use of tools and equipment</i>	
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

Topic 8: Fabrication of Components By Triangulation

SUBJECT OUTCOME	
Explain the factors critical to fabricating components using triangulation.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The reasons for using this method are explained according to specified requirements. A clear understanding of the direct consequences to self and business are shown. Possible workplace hazards that may be encountered while fabricating are listed and the risks associated with and the factors contributing to each work-related hazard are described. 	<ul style="list-style-type: none"> Explain triangulation clearly, correctly and comprehensively. Identify potential error-causing factors and compensate for them. Identify the reason why no other method will work. Demonstrate the techniques involved in applying this method correctly.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Prepare to fabricate components.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Permission to enter the workplace is obtained in accordance with specified requirements. The required personal protective equipment is selected, examined and used in a way that is consistent with its purpose, design and specified requirements. PPE is used to ensure the safety of persons and equipment. Tools, materials and equipment are selected, examined and transported in accordance with specified requirements. The workplace is examined and all hazardous conditions are dealt with according to specified requirements. The consequences on health, safety and production of not preparing by means of triangulation are explained. 	<ul style="list-style-type: none"> Obtain the required permission or clearance to enter the work area. Demonstrate how personal protective equipment is worn correctly. Correctly select the tools and equipment required for fabrication. Check all lifting equipment that may be used for mechanical correctness and safety.
ASSESSMENT TASKS OR ACTIVITIES	
Outcomes assessed in one fabricated model	

SUBJECT OUTCOME	
Fabricate the components.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The required personal protective equipment is selected, examined and used in a way that is consistent with its purpose, design and specified requirements. PPE is used to ensure the safety of persons and equipment. The job instructions are interpreted and the material is marked off in accordance with specified requirements. The components are fabricated according to specified 	<ul style="list-style-type: none"> Examine workplace for safeness and cleanliness. Use the triangulation development method and mark out templates. Use templates to produce components. Place correct components with each other to produce the product. Constantly check for correctness by measuring the product and ensure specifications are adhered to.

<p>requirements.</p> <ul style="list-style-type: none"> • Work-related hazards are dealt with in accordance with specified requirements. • Interpersonal interaction is demonstrated to be positive, consistent with specified requirements, effective in terms of teamwork and conflict-free. • Tools and equipment are used according to the manufacturer's design and without injury to self or others. • Consequences for health, safety and production of not fabricating the components in line with specified requirements are explained. <p><i>Range: PPE, interpretation and marking off, fabrication processes, hazards, interpersonal interactions, use of tools and equipment</i></p>	<ul style="list-style-type: none"> • Complete the job by checking the quality of the product and maintaining safe and neat working standards.
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4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN ENGINEERING FABRICATION – LEVEL 2

4.1 Integrated summative assessment task (ISAT)

A compulsory component of the external assessment (ESASS) is the **integrated summative assessment task (ISAT)**. The integrated summative assessment task (ISAT) draws on the students' cumulative learning achieved throughout the year. The task requires **integrated application of competence** and is executed and recorded in compliance with assessment conditions.

Two approaches to the integrated summative assessment task (ISAT) may be as follows:

The students are assigned a task at the beginning of the year which they will have to complete in phases throughout the year to obtain an assessment mark. A final assessment is made at the end of the year when the task is completed.

OR

Students achieve the competencies throughout the year but the competencies are assessed cumulatively in a single assessment or examination session at the end of the year.

It is suggested that at this level students should be assessed throughout the year with regard to the practical aspects of this level. This will effectively develop the knowledge and skills of students and will build their confidence to approach the next level of practical activities at the same level.

It will also eliminate year end assessment congestion and will help in creating valid and authentic assessments because assessments would not be rushed.

The integrated summative assessment task (ISAT) is set by an externally appointed examiner and is conveyed to colleges in the first quarter of the year.

The integrated assessment approach enables students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

4.2 National Examination

A National Examination is conducted annually in October or November by means of a paper(s) set and moderated externally. The following distribution of cognitive application should be followed:

LEVEL 2	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
	30%	50%	20%

MARK ALLOCATION PER QUESTION		
PAPER 1		
Question 1:	Principles and Techniques of Marking Off and Laying Out	15 marks
Question 2:	Templating and Patternmaking	15 marks

Question 3:	Power Machine Cutting	15 marks
Question 4:	Oxy-Acetylene Cutting	15 marks
Question 5:	Forming and Shaping Techniques	15 marks
PAPER 2		
Question 1:	Parallel Line	25 marks
Question 2:	Radial Line	25 marks
Question 3:	Triangulation	25 marks
TOTAL		150 marks