



VAAL UNIVERSITY OF TECHNOLOGY

FACULTY OF APPLIED AND COMPUTER SCIENCES

DEPARTMENT: NDT & Physics

WIL LEARNER GUIDE

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1. Foreword

1.1. The following conditions must be fulfilled for a student to graduate:

- (a) National Diploma: Non-Destructive Testing, a full year of work integrated learning (WIL) must be successfully completed as well as the university theoretical work.
- (b) Diploma: Non-Destructive Testing, a six-month period of suitable work integrated learning as well as the university theoretical and practical training must be successfully completed.

1.2. All registered students will be subjected to Level Certification, which is the prerequisite to operate in the NDT industry and required by applicable codes & standards.

Note: This requirement is comparable to the board examination required for Biomedical Technology graduates to work in the National Health Laboratory Services (NHLS).

1.3. Upon completion of each six months WIL period, students are required to submit a report detailing all the work performed and any projects completed.

(a) To assist the university in assessing the progress of your work integrated learning, you must submit progress reports on an on-going basis to the WIL coordinator as follows:

❖ Once every two months upon registration, e.g. if a student registers in January, he/she must submit the first progress report in February, the second in April and the third in June.

(b) Students should inform the WIL coordinator about their registration within a period of 1 month upon registration.

1.4. This Learner guide will make it easy to keep a permanent record of all activities during your WIL period and guide you on how to compile a report.

1.5. Ensure to submit the supervisor/ mentor evaluation report together with your final report. (*You can access the supervisor/ mentor evaluation template on the Co-operative Education website*).

2. Company visits

2.1. Company visits will be scheduled for students who have registered for WIL with the university.

The following will form part of activities during the visit:

- (a) Introductions and company overview.
- (b) Observation of student(s) performing a test or inspection and a tour of facilities (where possible).
- (c) Discussion of report compilation with student(s).
- (d) Discussion of work performance with supervisor or mentor.

3.1. Core learning

The student should be exposed to any of the following as part of WIL. Take note that this is not the minimum core learning objectives.

3.1.1 Visual Testing (VT)

The student should be able to:

- (a) select the appropriate technique for the VT method to be used.
- (b) interpret and translate VT codes, standards, specifications and procedures into NDT instructions adapted to the actual working conditions.
- (c) set up and calibrate the equipment.
- (d) perform tests on welds, forgings, castings, and composites.
- (e) compile reports.
- (f) interpret and evaluate results according to applicable standards, codes, specifications or procedures.
- (g) recommend preventative measures.

3.1.2. Liquid penetrant testing (LPT)

The student should be able to:

- (a) select the appropriate technique for the LPT to be used.
- (b) translate LPT Codes, Standards, Specifications and Procedures into practical work instructions.
- (c) perform weekly checks on the sensitivity of consumables.
- (d) prepare surface areas to be inspected.
- (e) set up and calibrate the equipment.
- (f) perform tests on welds, forgings, castings, and composites.
- (g) record and classify the results of the tests according to written instruction.
- (h) compile reports.
- (i) interpret and evaluate LPT results in accordance with relevant standards.
- (j) recommend preventative measures.

3.1.3 Magnetic particle testing (MPT)

The student should be able to:

- (a) select the appropriate technique for the MPT to be used.

- (b) translate MPT Codes, Standards, Specifications and Procedures into practical work instructions.
- (c) perform weekly checks on the sensitivity of consumables.
- (d) prepare surface areas to be inspected.
- (e) set up and calibrate the equipment.
- (f) perform tests on welds, forgings, and castings.
- (g) record and classify the results of the tests according to written instruction.
- (h) compile reports.
- (i) interpret and evaluate MPT results in accordance with relevant standards.
- (j) recommend preventative measures.

3.1.4 Eddy current testing (ECT)

The student should be able to:

- (a) select the appropriate technique for the ECT to be used.
- (b) translate ECT Codes, Standards, Specifications and Procedures into practical work instructions.
- (c) prepare surface areas to be inspected.
- (d) set up and calibrate the equipment.
- (e) perform tests on welds and forgings.
 - ❖ estimate depths of surface-breaking flaws.
 - ❖ measure the conductivities of materials.
 - ❖ measure thicknesses of coatings.
- (f) record and classify the results of the tests according to written instruction.
- (g) interpret and evaluating the inspection results in accordance with relevant standards.
- (h) compile reports.
- (i) recommend preventative measures.

3.1.5 Radiographic testing (RT)

The student should be able to:

- (a) select the appropriate technique for the RT to be used.
- (b) translate RT codes, standards, specifications and procedures into practical work instructions.
- (c) prepare surface areas to be inspected.
- (d) set up and calibrate the equipment.
- (e) perform tests on welds, forgings.
- (f) process films.

- (g) record and classify the results of the tests according to written instruction.
- (h) interpret radiographs and evaluating the inspection results in accordance with relevant standards.
- (i) compile reports.
- (j) recommend preventative measures.

3.1.6 Ultrasonic testing (UT) (Conventional, Phased Array, Time-of-flight Diffraction)

The student should be able to:

- (a) select the appropriate UT technique to be used.
- (b) translate codes, standards, specifications and procedures into practical work instructions.
- (c) prepare surface areas to be inspected.
- (d) set up and calibrate the equipment.
 - ❖ select suitable probes for certain applications.
- (e) perform tests on welds, forgings.
 - ❖ perform thickness measurements and corrosion detection.
- (f) record and classify the results of the tests according to written instruction.
- (g) interpret results and evaluating the inspection results in accordance with relevant standards.
- (h) compile reports.
- (i) recommend preventative measures.

3.2. Report structure

Report content should include a minimum of the following:

- (a) Cover page
 - ❖ Surname & initials
 - ❖ Student number
 - ❖ Contact number and email address
 - ❖ Report number
 - ❖ Company name and stamp
 - ❖ The mentor/ supervisor must also sign.

(Please see cover page template attached on the link)

- (b) Declaration of own work, for an example,

I (name and surname) declare that this report is my own work, based on my personal study and/or research and that I have acknowledged all material and sources used in its preparation, whether they

be books, articles, reports, lecture notes, and any other kind of document, electronic or personal communication. I also certify that this report has not previously been submitted for assessment in any other unit, and that I have not copied in part or whole or otherwise plagiarized the work of other students and/or persons.

(c) Table of contents

❖ The table of contents must be inserted automatically.

(d) The report should be in chapter format, e.g. Chapter 1 - Introduction and company overview, Chapter 2 - Magnetic Particle Testing, etc.

❖ The first chapter should be the introduction which includes the background of the company and the NDT methods performed in the company.

❖ **NB: the report must consist of at least 25 different practical reports in total.**

(e) Full description of all methods, specific practical's and projects performed. The procedure and reported results should be clearly indicated.

(f) New knowledge acquired in the workplace should form part of the conclusion.

(g) Referencing using Harvard style, e.g.

❖ Scott, I, *Basic Acoustic Emission*, Gordon and Breach Science Publishers, New York, NY, (1991).

❖ Cecco, V.S., Van Drunen, G., Sharp, F.L., *Eddy Current Testing, Volume 1*, GP Courseware, Columbia, MD, (1987).

❖ Krautkramer, J.(et al.) *Ultrasonic Testing of material*, Springer-Verlag Berlin, (1990).

3.2.1 Example of a report structure

Chapter 1 - Introduction

1.1 Introduce your company, i.e. background/history if possible, overview.

1.2 Your role in the company.

1.3 What the report will cover.

Chapter 2 – Any NDT method

2.1 Description of the method.

2.2 Procedure (this should include the acceptance and rejection criteria).

2.3 Practical

2.3.1 Practical 2.1

(a) Problem Statement

To write a persuasive problem statement, you need to describe the (i) ideal, (ii) reality and (iii) consequences.

(b) Written instruction

(c) Results

Tabulate the results, include figures of the results and explain what caused the defects.

(d) Recommendations

What is to be done next?

(e) New knowledge acquired

References

3.3. General instructions

- (a) All text must be typed in Times New Roman, 12-point size on single 1.5 line spacing and justified. Headings and subheadings should be in bold.
- (b) Leave out one line between text and figures.
- (c) The captions for figures should be clearly indicated and what information the figure is depicting. Figures must be in colour for clarity, e.g.

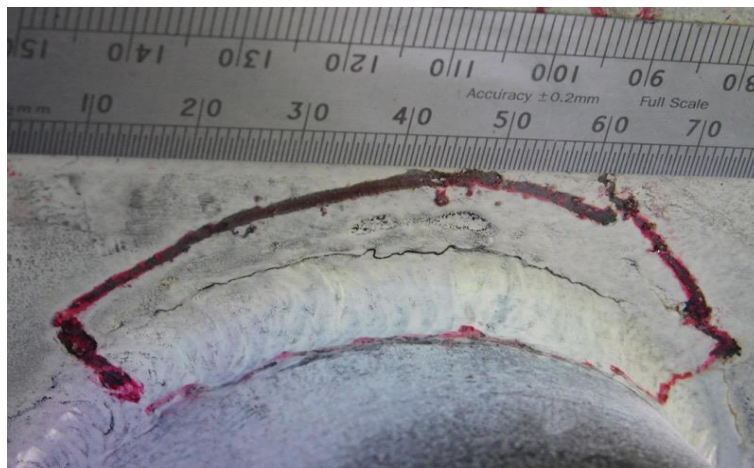


Figure 2.1: Crack on a flange

- (d) The height of a figure must be 6 cm and the width must be 10 cm.
- (e) The report must have a **minimum of 45 pages** inclusive of pictures & graphs and exclusive of the cover page & table of contents.
- (f) Reports must be bound upon submission.

3.4 Assessment of reports

The final report will be assessed by the supervisor/ mentor and the VUT NDT department. To standardize the assessment of reports, the following criteria will be applied.

Description	Weight
Problem statement	10
Structure of document	05
Language	10
Presentation of results	15
Practical value	50
Referencing	10
Total	100

3.5 Report submission and application for graduation

3.5.1 Completed reports must be submitted to (or handed in):

Vaal University of Technology
Department of Co-operative Education
Private Bag X021
Vanderbijlpark
1900

Telephone no: 016 950 9473

3.5.2 Application for graduation is through the

Examinations department
B110
Tel: 016 950 9290

For any further queries, please contact the NDT WIL co-ordinators on 016 950 6956