VAAL UNIVERSITY OF TECHNOLOGY

Inspiring thought. Shaping talent.

EMPLOYER & STUDENT GUIDE

Faculty	ENGINEERING AND TECHNOLOGY
Department	CIVIL ENGINEERING
Course	EXPERIENTIAL LEARNING 1 (CIVIL)
Title	ECEXL1A
Compiled By	K. GABORONE & F. ONYANGO
Year	2024
NQF Level	6
Credits	60

Vision of Vaal University of Technology

An African university that leads in quality teaching and learning, informed by research and driven by innovation and technology.

Mission of Vaal University of Technology

To produce employable and entrepreneurial graduates who can make an impact in society.

Values

Excellence, Creativity, Mutual Respect, Collegiality, Integrity, Tolerance, Diversity

DETAILS OF VUT MODERATORS (PERSONS RESPONSIBLE FOR THE EVALUATION OF THE WORK INTEGRATED LEARNING TRAINING REPORTS)

Title	Messrs
Name	K. Gaborone & F. Onyango
Address	Department of Civil Engineering and Building, Vaal University of Technology Private Bag X021, Vanderbijlpark, 1900
Office Number	Room No: RE311 (Engineering Building)
Telephone Number	016 950 9241 & 016 950 7657
Fax Number	016 950 9957
E-mail address	kabelog@vut.ac.za & felixo@vut.ac.za

TABLE OF CONTENTS

1. INTRODUCTION

1.1 To fulfil the requirements of the Civil Engineering Diploma, a student must complete at least six months (26 weeks minimum) of approved Experiential Training under the supervision of a qualified mentor. The mentor should either be from a professional Civil Engineering, Quantity surveying, Architecture, Real Estate Development and Construction Project Management, or at any other approved construction related enterprises.

1.2 In the curriculum for the Diploma: Civil Engineering, the Work Integrated Learning (WIL) component is completed within a continuous six months. The student is required to submit a reports in respect of the experiential training received during a twenty six week period within the particular year. The submission of satisfactory interim progress reports and a final report on work experience gained during the year shall be deemed as only requirement for obtaining the required credits for the subject. The granting of the required credits shall however be subject to the student complying with the required minimum time spent in training, adequately covering the principle work experience areas as outlined herewith and the student obtaining a minimum aggregate grade as allocated by both the mentor and university moderator. Students will also be required to be available for a final presentation assessment at the end of the year. Should the student fail to meet the minimum requirements, the training period would have to be extended until all identified deficiencies had been addressed and a satisfactory report can be submitted.

1.3 There are four parties involved in the Work Integrated Learning Training programme each with their own responsibilities. The parties are:

1.3.1 The Student
1.3.2 The Mentor/Supervisor: as the agent of the employer or training body
1.3.3 The Co-operative Education Department: as the agent of the VUT
1.3.4 The WIL Officer from the Department of Civil Engineering

1.4 Graduate attributes (GA's) of the programme this module contributes to

Experiential Learning 1 – CIVIL (ECEXL1A) will assess Graduate Attribute 9 and 12
Graduate Attribute 9 and 12 is measured during the in-service training, site visits, work integrated learning reports.

Graduate Attribute	Evidence required	Attribute covered in this module
1. Problem solving	Apply engineering principles to systematically diagnose and solve *well-defined* engineering problems in homework exercises, class tests and assignments.	No
2. Application of scientific and engineering knowledge	Apply knowledge of mathematics, natural science and engineering sciences to applied engineering procedures, processes, systems and methodologies to solve *well-defined* engineering problems in assignment and project work.	No
3. Engineering Design	Perform procedural design of components, systems, works, products or processes of *well-defined* engineering problems to meet requirements, normally within applicable standards, codes of practice and legislation.	No
4. Investigations, experiments and data analysis	Conduct investigations of *well-defined* problems through locating and searching relevant codes and catalogues, experiments and measurements during practical class.	No
5. Engineering methods, skills and tools, including Information Technology	Use appropriate techniques, resources, and modern engineering tools including information technology for the solution of well-defined engineering problems, with an awareness of the limitations, restrictions, premises, assumptions and constraints.	No
6. Professional and technical communication	Communicate effectively, both orally and in writing within an engineering context by means of presentations and report writing.	No
7. Sustainability and Impact of Engineering Activity	Demonstrate knowledge and understanding of the impact of engineering activity on the society, economy, industrial and physical environment by means of class tests and assignments.	Yes
8. Individual, Team and Multidisciplinary Working	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a technical team and to manage projects.	No
9. Independent Learning Ability	**Engage in independent and life-long learning through well-developed learning skills. The learning context is well-structured with some unfamiliar elements. Evidence: Project and assignment**	**YES**
10. Engineering Professionalism	Understand and commit to professional ethics, responsibilities and norms of engineering technical practice.	No
11. Engineering management	Demonstrate knowledge and understanding of engineering management principles.	No
12. Workplace practices	**Project-based learning: that brings together intellectual enquiry, real world problems and student engagement in meaningful work.**	**YES**

2. GUIDELINES

2.1 Objectives of Work Integrated Learning

The objectives of Work Integrated Learning is to give the student the opportunity to apply the basic theoretical and practical knowledge gained at University in a work environment and to develop the necessary ethics, professionalism and competencies as demanded by the relevant construction related practices and enterprises within the Construction Industry.

The student must be trained to such extent that he/she develops the necessary insight, experience and knowledge to function independently and in a competent manner in the work environment at the end of his Work Integrated Learning, within the stated aims and outcomes of the study program

To be able to fulfil this aim the employer must appoint a suitably qualified person as mentor to supervise the trainee student.

2.2 Minimum requirements

To ensure that the student gains an acceptable level of competence during the training period, the university sets certain minimum requirements in respect of the type of training that the student must receive during the Work Integrated Learning period. The University minimum requirements can be found in annexure 1.

Work that is of a nature that does not contribute much to the development of the student and not contributing towards the required outcomes of the program is unacceptable, not in the interest of the student and shall not be considered in the evaluation process.

2.3 Work Integrated Learning

Tasks to demonstrate this outcome is designed to connect academic learning with workplace practice and may be performed in one or more of the following types (Modalities) of work-integrated learning:

- Work-directed theoretical learning: in which theoretical forms of knowledge are introduced and sequences in ways that meet both academic criteria and are applicable and relevant to the career-specific components.

- Problem-based learning (PBL): where students work in small self-directed groups to define, carry out and reflect on a task which is usually a real-life problem.
- Project-based learning (PjBL): that brings together intellectual enquiry, real world problems and student engagement in meaningful work.
- Workplace based learning (WBL): where students are placed in a professional practice or simulated environment within a training programme.

Note: While Graduate Attribute 12 (GA 12) is specific to workplace practices, other attributes may be demonstrated simultaneously, like GA 9.

2.3.1 Graduate Attribute 12: Workplace practices

Demonstrate an understanding of workplace practices to solve engineering problems consistent with academic learning achieved.

Range Statement: Tasks to demonstrate this outcome should be designed to connect academic learning with workplace practice and may be performed in one or more of the following types of work-integrated learning

i) Work-directed theoretical learning.

ii) Problem-based learning.

iii) Project-based learning.

iv) Work-based learning, and

v) Simulated learning.

The assessment of the level of GA 12 acquisition shall be in line with the following typifying exemplified associated competency indicators:

1. Orientation to the working environment is described in terms of company structure and conventions, rules, policies, working hours, dress codes and reporting lines.
2. Labour practices used in the workplace are described in accordance with relevant legislation.
3. Workplace safety is described in terms of the application of relevant safety, health and environmental legislation.
4. General administration procedures are described in terms of how they operate and the key purpose.
5. Work activities are conducted in a manner suited to the work context.

2.3.2 Graduate Attribute 9: Independent learning ability

Demonstrate competence to engage in independent learning through well-developed learning skills.

Range Statement: Operate in well-structured environment with some unfamiliar elements requiring personal responsibility and initiative, accurately self-evaluate and take responsibility for learning requirements; be aware of social and ethical implications of applying knowledge in particular contexts.

The assessment of the level of GA 9 acquisition shall include assisting, contributing, observing and applying at least four of the specific practices below:

- Engineering processes, skills and tools, including measurement;
- Investigations, experiments and data analysis;
- Problem solving techniques;
- Application of scientific and engineering knowledge;
- Engineering planning and design;
- Professional and technical communication;
- Individual and teamwork; or
- The impact of engineering activity on health, safety and the environment.

In light of the above specific practices cognisance should be taken on the following indicators (often imbedded in the specific practices):

- Learning tasks are identified, planned and managed.
- The requirement for independent learning is identified/ recognised and demonstrated.
- Relevant information is sourced, organised and evaluated
- Knowledge acquired outside of formal instruction is comprehended and applied.
- Awareness is displayed of the need to maintain continued competence through keeping abreast of up-to-date tools and techniques available in the workplace.

6. Knowledge and understanding gained from the work-integrated learning period is reported in a prescribed format, using appropriate language and style.

2.4 Categories

The ideal is to give the student practical training in as many aspects related to Civil Engineering as possible. This would imply exposure to most of the topics listed below. The minimum requirement is that a student must acquire an acceptable level of proficiency in at least four (4) of the following major seven (7) categories as detailed in annexure 1:

- Administration
- Drawing
- Surveying
- Design
- Contracts
- Construction Supervision
- Materials Testing
- Special Projects (e.g Research, Investigation)

2.5 Project work

The student will identify a project work within the designated project. Mentors are expected to guide students on the scope of their projects but they must essentially be completed by students themselves. The presentation of the project must be in the format of project report as shown in annexure 3.

2.6 Computer Aided Work

It is desirable, but not compulsory, for the student to get experience in the use of computer software for solving problems or submitting documents and reports. Any software may be used. Some exposure to spread sheets, data base graphical displays, CAD, quantity surveying, programming, construction cost reporting software, GIS, etc. would be of benefit to students.

2.7 Reporting

All reports as stipulated must be submitted in the required format. Students must ensure that all reports as required are submitted in time to the university program moderator at the end of each term and semester in order to be considered for evaluation. Reports submitted late shall not be considered.

3. EVALUATION OF TRAINING

3.1 Evaluation

3.1.1 By the employer's appointed mentor who assesses and certifies the level of proficiency attained by the student, and accepts or rejects it.

3.1.2 To pass the student must obtain a minimum of Level 3 (adequate achievement: 50% - 74% Range Score as stipulated in the 4-Point Likert Scale in Table 1 provided below and to pass with distinction ≥75% (Level 4). The University acts as a moderator for the reports.

Table: 1 -point Likert scale Levels of Graduate Attribute (GA) Acquisition

Meet GA 9/12	**Meet GA 9/12**	**Did not meet GA 9/12**	**Did not meet GA 9/12**
4	3	2	1
Fully Achieved	Achieved	Partially Achieved	Not Achieved
75% - 100%	50% - 74%	25% - 49%	0% - 24%
Demonstrates a comprehensive, in-depth understanding and application of workplace practices to solve engineering problems consistent with academic learning achieved.	Demonstrates an overall understanding and application of workplace practices to solve engineering problems consistent with academic learning achieved.	Demonstrates some ability to understanding and application of workplace practices to solve engineering problems consistent with academic learning achieved.	Demonstrates minimal or no ability to understanding and application of workplace practices to solve engineering problems consistent with academic learning achieved.

Levels 1-2 correspond to levels of pre-acquisition. At level 3, mastery and/or acquisition of an attribute is deemed acceptable in a university setting. Level 4 designate a level of excellence that may go beyond what is expected in a university setting and may not be reached by all students (Ipperciel & ElAtia, 2014).

3.1.3 By the university's WIL Officer who shall moderate the employer's evaluation and student's submitted reports. The WIL officer reserves the right to interview a student at any time during the training period and conduct an assessment at the premises of the university at the end of the training period, which the student shall be compelled to attend. It is the student's responsibility to consult the WIL officer during the S6 semester before the final report is submitted, if any uncertainties should require clarification.

4. REPORTING

4.1 Every report must have a cover page, clearly indicating:
All the relevant student information, i.e. initials, surname, signature, student number, name of diploma (field of study at the Vaal University of Technology), company, mentor/supervisor, signature, contact tel. no., etc.

Which report it is, i.e. either progress report or semester report or project report.
Which period this report covers, i.e. from which date (dd-mm-yyyy) till which date (dd-mm-yyyy).

The report structure should include includes the following;

Introduction

Background and overview of your organisation including among other things
Nature of projects, organogram showing the student's position, size of the firm, geographical location etc.

All headings to be numbered with font size 14 and must be in bold or must be underline if not in bold but not both.
Body font size must be 12 with 1.5 spacing.
All figures, tables and appendices to be numbered, captioned and referenced.
All cited literature in the report must be referenced using Harvard referencing style.

Students must include their contact cell numbers and email addresses for the final Assessor's feedback on their reports.

Progress report - Word count: 2000 (±5%) excluding appendices, references/bibliography,
Semester report - Word count: 4000 (±5%) excluding appendices, references/bibliography.
Annexure 2 and 4 should be attached to the semester and project reports respectively.
Each category/knowledge area covered/reported should be a minimum of 1 page, and that excludes pictures and tables. (This has taken into consideration the fact that sometimes students tend to be more exposed in some activities than others.

Reflection

The students are required to write 200 words on the last page of the report to reflect on the experience obtained through the WIL and also link the experiences to the module studied in relation to the type of projects the student was exposed to.

The students can discuss the weakness and strength of how practical module was understood or taught in relation to practical experiences or new technology onsite.

Further assessment

It is mandatory for students to conduct presentations of the project report to the VUT WIL team. The presentations will be conducted within the last two weeks of November and the dates will be communicated accordingly.

5. THE DUTIES AND RESPONSIBILITIES OF THE STUDENT

5.1 In order to successfully complete the Work Integrated component, the student must comply with the following conditions:

The student must have a mentor, who will certify that the student has completed the work required satisfactorily.

During work integrated learning, the student must submit a progress report after three months (10 pages minimum) that contains sufficient information. This report must be approved by the student's mentor before being submitted to the Department of Civil Engineering, Vaal University of Technology.

On completion of the training period, the student must submit a Semester report and a Project report (each 20 pages minimum). All reports should be ring-bounded otherwise it will not be accepted for marking

A logbook kept up to date by each student serves as a good personal record for all Work Integrated Learning received.

5.2 Work Integrated Learning term and Report Submission

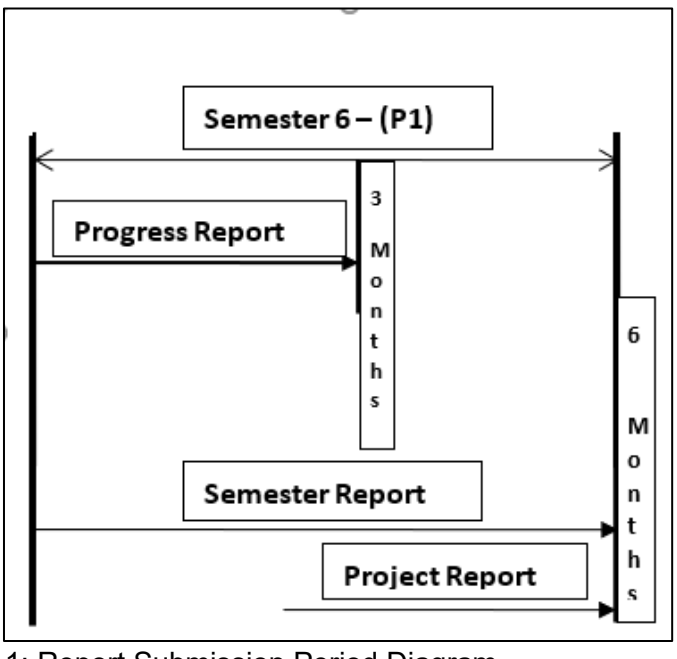

Figure 1: Report Submission Period Diagram

If the work submitted does not comply with the level of proficiency required, the Work Integrated Learning period will be extended until the expected level has been achieved.

6. THE DUTIES AND RESPONSIBILITIES OF THE EMPLOYER

6.1 The Employer must undertake to provide a Work Integrated Learning training programme, or conform to the programme laid down by the VUT.

6.2 The employer must appoint a suitable mentor to supervise the Work Integrated Learning student. The mentor must be suitably qualified in Civil Engineering, Quantity Surveying, Construction Management, Architecture, Building technology or Real Estate, within a senior position within the particular organisation or practice.

6.3 The mentor's responsibilities:

6.3.1 The mentor must ensure that the student receives suitable training, assumes responsibility for stimulating a suitable working environment and the implementation of the training programme. The mentor must ensure that the scope and depth of the Work Integrated Learning to which the student is being exposed is sufficient to obtain the required level of proficiency.

6.3.2 At the end of the training period the mentor must check the accuracy of the student's Work Integrated Learning report, evaluate it using marking rubrics in annexure 2 & 4 and endorse it by way of a signing off.

7. THE DUTIES AND RESPONSIBILITIES OF THE WIL OFFICER

7.1 On behalf of VUT the WIL Officer will check the student's progress and the completed and signed Work Integrated Learning report and projects.

7.2 The WIL Officer will assess and moderate the student's Work Integrated Learning Report.

7.3 The WIL Officer will advise and guide the mentor or the student in any aspect of the Work Integrated Learning requirements.

7.4 It is envisaged that the WIL officer or moderator could visit the student at the place of training whenever deemed necessary. The student’s diary should be up to date at all times for presentation during such visits.

8. REFERENCE

1. Ipperciel, D and ElAia, S. (2014). Assessing Graduate Attributes: Building Criteria – Based Competency Model. International Journal of Higher Education, Volume 3, No.3. doi:10.5430/ijhe.v3n3p27.

INDICATIVE TASK PROFILES FOR WORK INTEGRATED LEARNING REPORTING

A. WORK CATEGORIES

A.1 ADMINISTRATION

Safety (OHS Act)
Organisational structure within business
Financial planning, cash flow forecasting
Contract documents
Office and site administration: Meetings, reports, minutes, memo's; site diary; order, deliver and control of materials, labour related issues such as time sheets
Productivity and work study; quality control
Elementary management and accompanying decisions
Environmental awareness

A.2 DRAWING

A.2.1 SABS 0400
CAD training
Drawing office practice, i.e. documentary systems, indexing and micro-film production

A.2.2 Scales of drawings, Printing and line work, Dimensioning & Site sketches of site conditions

A.2.3 Preparing working drawings (either on a drawing board or using a CAD-system) for earthworks, roads, railway lines, underground pipe lines, concrete structures, structural steel structures and architectural buildings

A.2.4 Experience in reading complex drawings such as for freeways, bridges, multi-storey buildings, shopping centres, etc

A.2.5 Water, Gauging weirs, Water towers, reservoirs, earth dams, concrete dams
Drawing of flow diagrams, hydrographs and hyetographs, detailing of anchor blocks, couplings and connectors, etc

A.3 SURVEYING

A.3.1 Base line measurement, Setting out of elementary structures, Linear surveying,
Levelling for earthworks design, Contouring, Setting out of levels; sight rails
Levelling of cross sections and grade lines
Draw longitudinal and cross sections
Precise levelling
Reduction of all fieldwork (rise & fall and collimation methods)
Inverted staff levelling
Volume calculation

A.3.2 Traversing
Tape and E.D.M. traversing
Reduction of all fieldwork
Setting out: by co-ordinates
Deflection angles and distances

A.3.3 Tacheometry
Observing stations and plot on plans

A.3.4 Curves
Staking of a horizontal circular curve, etc
Setting out of PI, CP, etc

A.4 DESIGN

Get exposure to/work in a team involved with and get experience/learning in:

A.4.1 Roads: (Gravel, flexible & rigid pavements)
Do a design project including:
Horizontal and vertical curves
Earthworks (mass-haul diagrams, cut and fill)
Drainage design
Longitudinal sections
Cross-sections

A.4.2 Steel structures
Design of roof trusses
Design of beams, purlins and girts
Design of crane girders (compound and plate)
Design of columns and bases
Design of connections e.g. moment end plate (bolted and welded)

A.4.3 Concrete structures
Foundations
Columns
Beams
Slabs
Retaining walls
Bending schedules

A.4.4 Timber
Shuttering
Roof trusses
Beams
Columns
Connections (nailed and bolted)

A.4.5 Masonry
Unreinforced load-bearing walls
Unreinforced columns

A.4.6 Water
Determination of hydraulic and energy grade lines, thrusts/forces, flow, velocity, and head loss
Design for sizing of various water and wastewater treatment units, and hydraulic profiles through process units
Hydrograph analysis and determination of unit hydrographs
Analysis of rainfall data for frequency prediction
Drainage assessment and use of rational and other methods to obtain flow for design of storm sewers
Design for flood routing and flood lines
Statistical analysis of data
Design of anchor blocks, pipe bedding, water supply pipe line systems, water storage facilities, pumping, stormwater systems, domestic wastewater systems, surge tanks and protection against water hammer and pipe corrosion
Selection of materials for conduits, flow measuring devices, etc
Sewage treatment
Gauging weirs

A.4.7 Sport & Recreation facilities

A.4.8 Where applicable, the application of SABS 0400

A.5 CONTRACTS

Pre-tender, tender, pre-contract, contract planning phases
Contract planning techniques such as bar charts, precedence diagram method, critical path scheduling, linear scheduling
Hand over, retention period, commissioning period
Resource scheduling (labour, plant, material)

General conditions of contracts
Bill of quantities
Estimating and build-up rates
Measurement
Price adjustment schedule and payment certificates
Planning, organising, activate, control systems/methods
Quality and time management
ISO 9000 series
Safety (OHS Act)

A.6 CONSTRUCTION SUPERVISION

Get hands-on and monitoring experience/learning in:

Ability to read drawings, set-out, construct and finish
Site establishment
Safety concerning trench excavation, large earthwork operations, inspection of sewer lines, OHS Act
Concreting - mix design, transporting, placing, compaction and testing
Materials - introduction to sand, stone, timber, reinforcing, cement, lime, aluminium, plastics, structural steel, pipes
Quarrying and crushing
Environmental awareness
Introduction to codes and regulations: TRH, SABS, etc.
Earthworks - site clearance, excavations and stabilisation, backfilling, borrow pits
Foundations, piling
Structures - columns, beams, floors, roofs and methods of construction
Construction plant
Repair work to structures
Removal and moving of existing services
Roads - stabilisation, modification of material and testing. Construction of sub-grade, sub-base, base, wearing course, kerbing and channelling
Rail applications
Pipelines - supplying, laying and bedding of all types of pipes, conduits, couplings and testing
Fixing of reinforcing steel, different methods of tying reinforcing, use of cover blocks and spacers
Erection and stripping of formwork and scaffolding, the different types, storage, protection
Application of geo-synthetic materials including laying and finishing of
Quality assurance and control (ISO 9000 series)
Construction plant and maintenance

A.7 MATERIALS TESTING

A.7.1 Geotechnical applications
The student should be subjected to site investigations from the planning stages through to sampling, soil testing (all soil tests) and compiling the final report

A.7.2 Bitumen and asphalt for road construction
Aggregates for road construction and concrete
Concrete - slump test, cube crushing strength, core crushing

A.7.3 Water
Testing fluids for mass density, viscosity, surface tension, capillarity, pH, conductivity, etc
Water quality assessment
Measurement of humidity, rainfall, infiltration and permeability of soil, evaporation, surface runoff and yield of boreholes

A.8 SPECIAL PROJECTS/WORK CATEGORY

A.8.1 Special projects that include research on any engineering activity or material for example, i) CSIR type of work) and Engineering management systems such as i) Integrated Water Resource Management (IWRM), ii) Rural Road Asset Management System (RRAMS) e.t.c.

VAAL UNIVERSITY OF TECHNOLOGY
Inspiring thought. Shaping talent.

STUDENT INFORMATION FORM

WORK INTEGRATED LEARNING (ECEXL1A)

Department of Civil Engineering

STUDENT INITIALS & SURNAME	

STUDENT NUMBER		IDENTITY NUMBER	

TRAINING PERIOD	FROM		TO	

COMPANY	
MENTOR	

COMPANY ADDRESS		
	TELEPHONE NUMBER	

EXPERIENTIAL TRAINING REPORT	
Progress	
Semester	
Project	

STUDENT SIGNATURE :		DATE:	
MENTOR SIGNATURE :		DATE:	

SEMESTER REPORT MARKING FORM (Graduate Attribute 12)

Outcomes assessed/ Competency Indicators		Assessment weight	Possible evidence	Assessment Principles satisfied:	Comments	Results*	
						Mentor	Moderator
Report **Administration**	11.1 Orientation to the working environment is described in terms of company structure and conventions, rules, policies, working hours, dress codes and reporting lines. 11.2 Labour practices used in the workplace are described in accordance with relevant legislation. 11.3 Workplace safety is described in terms of the application of relevant safety, health and environmental legislation. 11.4 General administration procedures are described in terms of how they operate and the key purpose. 11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Professional and technical communication • The impact of engineering activity on health, safety and the environment	***25%- All Competency Indicators contributes equally towards the final 25% weight for administration***	**The contents of the report, the marks given by the employer/mentor and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			
Drawing	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Professional and technical communication	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			

Surveying	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Engineering processes, skills and tools, including measurement. • Individual and teamwork	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			
Design	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Engineering planning and design; • The impact of engineering activity on health, safety and the environment	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			
Contracts	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Professional and technical communication; • Engineering processes, skills and tools, including measurement.	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			
Construction Supervision	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • The impact of engineering activity on health, safety and the environment. • Engineering processes, skills and tools, including measurement.	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			

Material Testing	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Investigations, experiments and data analysis.	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done.**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			
Special Projects/Work Category e.g. IWRM, RRAMS, CSIR	11.5 Work activities are conducted in a manner suited to the work context. Range: Work activities include assisting, contributing, observing and applying of the specific practices below: • Engineering planning and design; • Engineering processes, skills and tools, including measurement. • Investigations, experiments and data analysis.	***25%- Competency Indicators contributes equally towards the final 25% weight for this activity***	***Documentation:*** **The contents of the report, the marks given by the employer and comments must clearly show that the student mastered the work done**	**Assisting:** ☐ **Contributing:** ☐ **Observing:** ☐ **Applying:** ☐			
					TOTAL MARKS		
					PERCENTAGE		
					FINAL MARK BY UNIVERSITY		

0% - 24% :Not Achieved (Does not meet GA)

25%-49% :Partially Achieved (Does not meet GA)not competent,

50%-74%: Competent Achieved (Meets GA) and Over Competent.

75% - 100% : Fully Achieved (Meets GA)

This mark must be given and signed by the employer (Mentor)! **This mark is important because it shows the evaluator of the University (moderator) how the student copes in practice as well as how the knowledge of the student improved over time.**

Note to moderator: ***The total marks achievable is 100%, i.e. 25% for the minimum of four learning categories as specified in the guidelines. Should the learner cover more than four categories in the report, they will all be evaluated and the final mark converted to a percentage.***

MENTOR'S SIGNATURE ..... UNIVERSITY MODERATOR'S SIGNATURE.....

Annexure 2

TO BE COMPLETED BY THE MENTOR / EVALUATOR

It is hereby declared that the information contained in this document is correct and that the student has done the prescribed training for the period indicated.

Company Stamp

NAME .....
DESIGNATION .....
SIGNATURE .....
DATE .....

PROFESSIOANAL REGISTRATION

ECSA ☐
SACPCMP ☐
OTHER ☐ SPECIFY _____

REGISTRATION CATEGORY

Pr Eng ☐
Pr Tech Eng ☐
Pr Techni Eng ☐
Pr CPM ☐
OTHER ☐ SPECIFY _____

REGISTRATION NUMBER .....

FOR UNIVERSITY USE ONLY

FINAL MARK: .....%

NAME .....
DESIGNATION .....
SIGNATURE .....
DATE .....

ECSA REGISTRATION CATEGORY .....

eg. Pr Eng or Pr Tech Eng

ECSA REGISTRATION NUMBER .....

VAAL UNIVERSITY OF TECHNOLOGY

FACULTY OF ENGINEERING

PROJECT REPORT GUIDELINES FOR WIL

When doing projects during your experiential training period the following guidelines, for writing the report, should be followed by all students. More detail on the projects can be obtained from the specific departmental guidelines. The project report guideline design intents to measure student independent learning ability (Graduate Attribute 9).

1. CONTENTS

1.1 Table of contents with page reference.
1.2 List of tables, figures and drawings.
1.3 Identification of the problem:

When starting with a project it often is the case that the problem to be solved may not be obvious and only symptoms are apparent.

At this stage one should keep an open mind to not only see the problem but to understand its relationship with its environment.

Once a problem is identified and understood it must be formulated and written down. Objects to be met, specific requirements, unacceptable conditions and factors to be considered when the eventual solution to the problem is to be evaluated, must be known and recorded.

1.4 Statement of the problem:

The problem should be stated in one sentence. If this is not possible, the problem is not clearly understood.

The statement consists of three basic components:

1.4.1 In the first part of the sentence the “what needs to be done” should be addressed.
1.4.2 Secondly the standard and principles on which the solution will be based, must be stated.
1.4.3 Finally, the goal to be achieved or “why the design/solution needs to be done/found” is answered.

1.5 Statement of sub-problems:

Some projects will be too large to be handled by a single person. Such projects should be divided into smaller projects, or sub-problems, that will be easier to comprehend and then given to other people to solve.

1.6 Delimitation:

State all references as far as the gathering of information is concerned. In the problem statement the project leader states exactly what will be done? It is also important that he/she specifies what he/she does **not** intend to do.

1.7 Assumptions:

The factors that will be taken for granted and will not be incorporated into the solution must be clearly stated.

1.8 Gathering of information:

The gathering of information is extremely important and is not always that obvious. Important sources of information are:

- **1.8.1** People.
- **1.8.2** Written material – books, catalogues, reports, and magazines.
- **1.8.3** Experimental data, designs, and drawings.
- **1.8.4** Existing conditions.
- **1.8.5** The Internet.

1.9 Preliminary Ideas:

This is the stage in which your imagination and creativity plays a major role. Try to think of a number of possibilities to the solution. Sketch your different ideas and write down the advantages and disadvantages. Don't limit yourself. Think beyond your frame of reference.

1.10 Evaluation of ideas:

Select the best idea or combine some of the ideas to create new possibilities. Preliminary calculations and discussions with the relevant people will help to eliminate some of the ideas.

1.11 Analysis:

All calculations and deliberations must be reported under this heading.
What are the social and ethical implications of applying knowledge in particular contexts.

1.12 Implementation of the solution:

State how the solution was implemented and supply support material such as sketches, drawings and graphs.

1.13 Recommendations:

State all the recommendations made to the company on grounds of the solution.

1.14 Conclusion:

Give a summary of what had been achieved and to what value this project with its solution was to the company.

Thank everybody who contributed to the project.

1.15 References:

PROJECT REPORT MARKING FORM (Graduate Attribute 9)

Controlled by:

Mentor: _____ University moderator: _____

Using University guidelines for project report writing: ☐

Using Company guidelines for project report writing: ☐

Results:

Specific Practices	Mentor*	Moderator	Max Marks
Engineering processes, skills and tools, including measurement			25
Investigations, experiments and data analysis			25
Problem solving techniques			25
Application of scientific and engineering knowledge			25
Engineering planning and design			25
Professional and technical communication			25
Individual and teamwork			25
The impact of engineering activity on health, safety and the environment			25
Total			
Percentage			
Final Mark by University (average)			

***This mark must be given and signed by the employer! This mark is important because it shows the evaluator of the University how the student copes in practice as well as how the knowledge of the student improved over time.

The student should be competent (>50%) in at least FOUR of the specific practices above, if not the report will be referred back to the student for rectification.

Note to mentor: The total marks achievable is 100%, i.e. 25% for each minimum of four specific practices as specified in the guidelines. Should the learner cover more than four categories in the report, they will all be evaluated and the final mark converted to a percentage.

I hereby declare that this project report is my own work.

Signature of the Student: _____ Date: _____

This project complies/does not comply with all the set standards *

Signature of the Mentor: _____ Date: _____

This project complies/does not comply with all the set standards *

Signature of the University Moderator: _____ Date: _____

** delete which is not applicable*

TO BE COMPLETED BY THE MENTOR / EVALUATOR

It is hereby declared that the information contained in this document is correct and that the student has done the prescribed training for the period indicated.

NAME .....
DESIGNATION .....
SIGNATURE .....
DATE .....

Company Stamp

PROFESSIOANAL REGISTRATION

ECSA ☐
SACPCMP ☐
OTHER ☐ SPECIFY _____

REGISTRATION CATEGORY

Pr Eng ☐
Pr Tech Eng ☐
Pr Techni Eng ☐
Pr CPM ☐
OTHER ☐ SPECIFY _____

REGISTRATION NUMBER .....

FOR UNIVERSITY USE ONLY

FINAL MARK: .....%

NAME .....
DESIGNATION .....
SIGNATURE .....
DATE .....

ECSA REGISTRATION CATEGORY .....
eg. Pr Eng or Pr Tech Eng

ECSA REGISTRATION NUMBER .....