VAAL UNIVERSITY OF TECHNOLOGY

Inspiring thought. Shaping talent.

STUDY GUIDE

Faculty	Engineering and Technology
Department	Electrical Engineering
Course	National Diploma in Engineering
Title	Work Integrated Learning P2
Compiled By	J Martins, W Pienaar, K Mitton, B Joubert . Revised by RM Schoeman
Year	2022
NQF Level	5
Credits	30
Approved	Advisory committee meeting 2008
Revised	None

CONTACT DETAILS

Please see VUT Co-operative Education's website for contact detail

https://www.vut.ac.za/cooperative-education/

GENERAL REQUIREMENTS

It is the responsibility of the student to register for P2 within four weeks after training commenced.

The registration, compilation and submission of reports must be done according to the guidelines.

An accredited assessor, appointed by industry, will do the assessment of each relevant unit.

The student must do the P2 training under the supervision of a mentor.

The assessor must complete the assessment report by awarding an assessment mark for all the relevant units and signing each mark.

The mentor in collaboration with the assessor (if not the same person) must determine a final mark for P2 and complete the Mentors declaration.

To fulfil the requirements of the National Diploma: Engineering: Electrical or for the National Diploma: Engineering: Computer Systems, the student must successfully complete all academic requirements as well as the work integrated learning (P1 and P2) component.

The syllabus is a generic WIL syllabus for the study fields of Electrical Engineering and Computer Systems.

The syllabus is for P1 and P2. The mentor can schedule the units for training in P1 and/or P2.

Units completed in P1, preferably should not be repeated in P2.

The units marked F (Fundamental) are compulsory. The student must be certified competent in all of them.

The units marked C (Core) are study field specific. The units required by VUT for a study field is marked and is compulsory.

Units or topics that are required by the training company must be identified by the mentor and marked C. The student should be certified competent in all of them.

The topics marked E (Elective). The mentor can select topics relevant to the training company.

Topics not in the syllabus but required by the training company should be added as electives to the syllabus by the mentor (unit 19).

F	=	Fundamental	*Compulsory*
C	=	Core	*Compulsory for specialization field*
E	=	Elective	*Choice*

REGISTRATION AND REPORT SUBMISSION INSTRUCTIONS

Please see VUT Co-Operative Education's website for information required and registration procedures
https://www.vut.ac.za/cooperative-education/

-

Progress report P2

Preparation and submission procedure:

- Twelve weeks after P2 training commenced a progress report must be submitted.
- Complete all the pages of the progress report.
- The report must be signed by the mentor and the student.
- The progress report must be submitted **via e-mail to the relevant WIL Co-ordinator**

Final report P2

Preparation and submission procedure:

- After completion of each unit, the unit must be assessed by the mentor and signed.
- The **project (compulsory)** must be done and the report (unit 20) completed by the student. The mentor must assess unit 20 and sign it off.
- After completing P2 training the mentor must compile the mentor's declaration and award a final mark for P2.
- The final report must be submitted **via e-mail to the relevant WIL Co-ordinator**

VAAL UNIVERSITY OF TECHNOLOGY

FACULTY OF ENGINEERING AND TECHNOLOGY

WORK INTEGRATED LEARNING (WIL)

VAAL UNIVERSITY
OF TECHNOLOGY

Inspiring thought. Shaping talent.

PROGRESS REPORT
P2

Procedure to complete and submit the progress report:

- Twelve weeks after P2 training commenced a progress report must be submitted
- Complete all the pages of the progress report.
- The report must be signed by the mentor and the student.
- The progress report must be submitted **via e-mail to the relevant WIL Co-ordinator**

1 GENERAL INFORMATION - PROGRESS REPORT **P2**

			Mark with X
DEPARTMENT:			
	ELECTRONIC ENGINEERING	**EAEXP1A**	
	POWER ENGINEERING	**EPEXP1A**	
	PROCESS INSTRUMENTATION	**EIEXP2A**	
	COMPUTER SYSTEMS	**ERWIL2A**	

STUDENT NUMBER:		**STUDENT'S** POSTAL ADDRESS:
INITIALS & SURNAME:		
ID NUMBER:		
E-MAIL:		
TELEPHONE (WORK):		CELL PHONE:

COMPANY NAME:		NUMBER OF EMPLOYEES:
DIVISION:		NUMBER OF STUDENTS IN TRAINING:
TRAINING SITE/STREET ADDRESS:		NUMBER OF ECSA REGISTERED STAFF:
		COMPANY'S SPECIALIZATION FIELD OR PRODUCTS

MENTOR	INITIALS & SURNAME:		ACCREDITED ASSESSOR: Y / N
	E-MAIL:		CELL OR TELEPHONE:

P2 PROGRESS REPORT START DATE:		END DATE :

VUT OFFICE USE : *ACCEPTED* □ *DECLINED* □

DEPARTMENT WIL OFFICIAL *SIGNATURE* *DATE*

2 UNITS COMPLETED

The following table must show the units successfully completed during the past three months.

UNIT NUMBER	UNIT NAME	DATES	
		STARTED	COMPLETED

3 UNITS SCHEDULED FOR THE NEXT THREE MONTHS

The following table must show the units that are scheduled for the next three months of training.

UNIT NUMBER	UNIT NAME	ESTIMATED DATES	
		START	COMPLETION

4 P2 PROJECT

The following is a short description of the project **planned** to be done in P2.

5 PERSONAL GROWTH

The following is a summary of what I have learned during the past three months in the units that I have completed.

Progress report P2 compiled by: *Students signature* *Date*
Progress report P2 certified as correct: *Mentor's signature* *Date*

VAAL UNIVERSITY OF TECHNOLOGY

FACULTY OF ENGINEERING AND TECHNOLOGY

WORK INTEGRATED LEARNING (WIL)

VAAL UNIVERSITY
OF TECHNOLOGY

Inspiring thought. Shaping talent.

FINAL REPORT
P2

Procedure to compile and submit the final report:

- After completion of each unit, the unit must be assessed by the mentor and
- The **project (compulsory)** must be done and the report (unit 20) completed by the student. The mentor must assess unit 20 and sign it off.
- After completing P2 training the mentor must compile the mentor's declaration and award a final mark for P2.
- The final report must be submitted **via e-mail to the relevant WIL Co-ordinator**

2 MENTOR'S DECLARATION - FINAL REPORT **P2**

VUT DEPARTMENT:			*Mark with* ***X***	
		ELECTRONIC ENGINEERING	**EAEXP2A**	
		POWER ENGINEERING	**EPEXP2A**	
		PROCESS INSTRUMENTATION	**EIEXP2A**	
		COMPUTER SYSTEMS	**ERWIL2A**	
STUDENT	**INITIALS AND SURNAME :**			
	VUT - STUDENT NUMBER :			
	ID NUMBER :			
TRAINING PERIOD	**P2 :**	***START DATE:***	**TO**	***COMPLETION DATE:***
	COMPANY :			
MENTOR	**INITIALS AND SURNAME :**			
	CELL OR TELEPHONE NUMBER :			
	E-MAIL:			
ASSESSMENT	**MARK :**	**%**		

DECLARATION

I, the above-mentioned mentor, declare that the above-mentioned student has completed the work integrated learning component (P2) of the qualification in the mentioned period under my supervision.
The student was found competent in the outcomes as specified in the assessment report.
The mark indicated above may be awarded to the student as the final result for work integrated learning P2.

Signature *Date*

VUT OFFICIAL	**FINAL MARK :**	**%**

3 **ASSESSMENT REPORT P2**

SYLLABUS

TRAINING SCHEDULE

	F	**Fundamental *(Compulsory)***
	C	**Core *(Compulsory for specialization field)***
	E	**Elective *(Choice)***
EE		**ELECTRONIC ENGINEERING**
PE		**POWER ENGINEERING**
PI		**PROCESS INSTRUMENTATION**
CS		**COMPUTER SYSTEMS**

								ASSESSOR'S USE	
	ORIENTATION / INDUCTION	**EE**	**PE**	**PI**	**CS**	**START DATE**	**END DATE**	**MARK**	**SIGNATURE**
Unit 1	General introduction to your specific environment.	**F**	**F**	**F**	**F**				
	After completion of this unit the student should be able to do the following: Understand the policy and mission of the company as laid down in the orientation program.								

								ASSESSOR'S USE	
	SAFETY AND FIRST AID	**EE**	**PE**	**PI**	**CS**	**START DATE**	**END DATE**	**MARK**	**SIGNATURE**
Unit 2	Industrial or Mining safety regulations as applicable	**F**	**F**	**F**	**F**				
	NOSA course	**F**	**F**	**F**	**F**				
	Basic first aid course	**F**	**F**	**F**	**F**				
	After completion of this unit the student should be able to do the following: • Contribute to the safety, health and environment of the industry as laid down in a safety program. • Demonstrate and comply with relevant OHSACT. • Demonstrate and comply with NOSA safety standards.								

								ASSESSOR'S USE	
	BASIC HAND SKILLS	**EE**	**PE**	**PI**	**CS**	**START DATE**	**END DATE**	**MARK**	**SIGNATURE**
Unit 3	Mechanical.	**F**	**F**	**F**	**F**				
	Electrical / Electronic / Computer.	**F**	**F**	**F**	**F**				
	After completion of this unit the student should be able to do the following as applicable to the discipline: Competent use of basic tools and equipment.								

								ASSESSOR'S USE	
	TEST EQUIPMENT	**EE**	**PE**	**PI**	**CS**	**START DATE**	**END DATE**	**MARK**	**SIGNATURE**
Unit 4	Basics of test equipment	**F**	**F**	**F**	**F**				
	Application of test equipment	**F**	**F**	**F**	**F**				
	After completion of this unit the student should be able to do the following: • Demonstrate the understanding of the basics of test equipment • Operate electrical, electronic or computer test equipment used in the specific field.								

	COMPONENTS / DEVICES	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 5	Use	F	F	F	F				
	Characteristics	F	F	F	F				
	Identification	F	F	F	F				
	Testing/ calibration	F	F	F	F				
	After completion of this unit the student should be able to do the following: Demonstrate the identification, calibration, testing or use of components/devices.								

	FAULT FINDING AND MAINTENANCE	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 6	Components	F	F	F	F				
	Circuits	F	F	F	F				
	Systems	F	F	F	F				
	Equipment	F	F	F	F				
	After completion of this unit the student should be able to do the following: • Interpretation of applicable diagrams. • Demonstrate the ability to do fault finding and rectification. • Test / Calibrate instruments, systems or equipment.								

	CIRCUITS AND FLOW DIAGRAM DESIGN	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 7	Basic design	F	F	F	F				
	Computer design software	F	F	F	F				
	Simulation / Emulation	F	F	F	F				
	After completion of this unit the student should be able to do the following: • Develop circuit diagrams / flow diagrams. • Demonstrate the interpretation of circuits / flow diagrams. • Demonstrate knowledge of simulation / emulation.								

	PROGRAMMABLE DEVICES	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 8	Programmable devices	F	F	F	F				
	After completion of this unit the student should be able to do the following: Programming, downloading and testing of programs for different programmable devices.								

Unit 9	INSTALLATION AND COMMISSIONING	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Plant equipment	F	F	F	F				
	Systems	F	F	F	F				

After completion of this unit the student should be able to do the following:

- Show the ability to work independently in an industrial environment.
- Show the ability to successfully install and commission equipment or a system.

Unit 10	TELEMETRY	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Communication systems	F	E	F	F				

After completion of this unit the student should be able to do the following:
Demonstrate knowledge of installation, faultfinding and understanding of telemetry communication systems.

Unit 11	PROTECTION	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Specifications	F	C	F	F				
	Implementation	F	C	F	F				

After completion of this unit the student should be able to do the following:
Demonstrate the sound knowledge and understanding of different types of protection and safety systems.

Unit 12	PROJECT	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Industrial project	F	F	F	F				
	Documentation	F	F	F	F				

After completion of this unit the student should be able to do the following:

- Use of project management tools.
- Successful completion of a project.
- Submit project report for assessment.

Unit 13	ENERGY SOURCES	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	DC sources	C	C	E	E				
	AC sources	C	C	E	E				
	Alternative energy sources	E	E	E	E				
	Converters	E	E	E	E				
	Inverters	E	E	E	E				

After completion of this unit the student should be able to do the following:

- Implementation of knowledge on different types of energy sources.
- Implement operating principals of converters and inverters.

	DISTRIBUTION AND TRANSMISSION	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 14	Specifications		C						
	Implementation		C						

After completion of this unit the student should be able to do the following:
- Demonstrate the understanding of distribution and transmission specifications.
- Implement the principles of electrical distribution and transmission.

	HARDWARE SYSTEMS	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 15	Hardware System Architectures	E		E	C				
	System/Circuit analysis and fault finding	E		E	C				
	System interfaces and peripherals	E		E	C				

After completion of this unit the student should be able to do the following:
- Develop the ability to configure and maintain digitally based hardware equipment.
- Perform minor system developments or improvements.

	DATA COMMUNICATION SYSTEMS	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 16	Data Systems / Networks	E		E	C				
	Data operating systems	E		E	C				
	Administrative / technical support	E		E	C				

After completion of this unit the student should be able to do the following:
- Develop the ability to configure and maintain data communication systems and equipment.
- Be able to perform system installation and minor system developments/improvements.

	SOFTWARE SYSTEMS	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 17	Program Design	E	E	E	C				
	Program Maintenance	E	E	E	C				
	Software Engineering	E	E	E	C				
	Programming Languages	E	E	E	C				
	Using Integrated Packages	E	E	E	C				

After completion of this unit the student should be able to do the following:
- Demonstrate the ability to program applications.
- Be able to maintain existing programs.

Unit 18	SYSTEMS ANALYSIS AND DATABASES	EE	PE	PI	CS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Corporate Policy	**E**		**E**	**E**				
	Systems Analysis Methodology	**E**		**E**	**E**				
	Database Design	**E**		**E**	**E**				
	Case tools	**E**		**E**	**E**				
	Database Administration	**E**		**E**	**E**				

After completion of this unit the student should be able to do the following:

- Show the application of system analysis methodology.
- The ability to consider corporate policy requirements within the design.
- Use suitable case tools to document the solution.
- Apply appropriate database administrative techniques.

Unit 19	OTHER TOPICS	START DATE	END DATE	ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Any other specialization field specific topics may be added by the mentor. The mentor must give realistic credit values to the topics.				

Unit 20

P2 PROJECT (COMPULSORY)

The P2 project (unit 20) is compulsory.
The student under supervision of the mentor must identify and complete a project.
The mentor must ensure that:

- The project is at least on the level, expected for successful completion by a novice technician.
- The student completes the project by working as independently as possible (to be assessed by mentor).
- After the completion of the project, the student must give an oral presentation on the project to the mentor and peers (to be assessed by mentor).
- The student must document the project according to the industry's standards (to be assessed by mentor).

ASSESSOR'S USE *Comments if needed*		
	Oral presentation	/20
	Assessment of documentation	/20
	Independent working ability of student	/20
	Technical standard of project	/20
	Technical success of project	/20
Signature *Date*	**Final mark of P2 project**	**%**

PROJECT NAME:

PROJECT OBJECTIVE

BUDGET AND PROJECT TIMETABLE

PROJECT OUTCOME
(Please attach a photograph of the project and description of not more than 5 pages)

Evaluation guideline

This guideline can be used by the assessor to do student evaluation.

Rating	Theoretical knowledge	Application of theory	Use of: advanced tools / measuring equipment	Skills integration / Competencies gained	Working speed	Accuracy	Interpersonal relations	Diligence motivation
1 **0-19%**	Has little knowledge	Cannot apply any theory	Cannot use advanced equipment	Has not integrated any skills	Very slow and do not successfully complete any tasks	Never accurate	Does not get along with any staff	Does nothing unless instructed
2 **20-39%**	Can recall some basic knowledge	Can apply some theory with assistance	Can use advanced equipment with assistance	Has integrated some documented skills	Never complete tasks successfully on time	Has to redo and then sometimes accurate	Can interact positively with most of the staff	Does just enough to keep out of trouble
3 **40-59%**	Knows the basic minimum	Can apply the basic minimum theory	Can use advanced equipment to do the basic minimum	Has integrated the basic minimum documented skills	Just complete tasks successfully on time	Just meets the minimum specifications	Interact positively with all the staff	Does the minimum expected
4 **60-79%**	Good knowledge	Can apply high level theory	Can select and use advanced equipment independentl y	Effectively integrate skills as needed in practical applications	Normally complete all tasks successfully before/on time	Work is always better than minimum expected	Is accepted by the staff as somebody with good personal skills	Normally looks for over and above work to do
5 **80-100%**	Excellent knowledge	Can analyze and synthesize	Optimally select and use advanced equipment	Innovatively integrate all theoretical and practical skills to solve problems	Always complete all tasks successfully before time	Work is always excellent.	Uses personality to positively influence other staff	Ambitious and eager to prove talents beyond requirements