VAAL UNIVERSITY OF TECHNOLOGY

Inspiring thought. Shaping talent.

LEARNER GUIDE

Faculty	Engineering and Technology
Department	Electrical Engineering
Course	Computer Systems
Title	EIEXC2A Work Integrated Learning 2
Compiled By	KT NSHIMBA
Year	2024
NQF Level	5
Credits	16

CONTENTS

REGISTRATION AND REPORT SUBMISSION INSTRUCTIONS

CONTACT DETAILS

DEPARTMENT	OFFICE	E-MAIL ADDRESS	TELEPHONE
Computer Systems Coordinator	R005	nshimba@vut.ac.za	0169507519
Co-operative Education	N000	carlen@vut.ac.za	016 950 9161

GENERAL REQUIREMENTS

- It is the responsibility of the student to register for WBL before training commences.
- The student will simultaneously register for EIEXC1A, EIEXC2A and EIPRC4A, which are the three components of the workplace-based learning.
- The registration, completion and submission of reports must be done according to the guidelines on page 4.
- An accredited assessor, appointed by industry, will do the assessment of the project. This assessor must have a qualification that is equal to or higher than the qualification being assessed.
- The student must do the training under the supervision of a mentor, which could also be the assessor if the mentor has the necessary qualifications.
- A VUT accredited staff member will act as examiner.
- The assessor must complete page 6, the assessor's declaration (page 9), as well as the assessment report (page 8 to19).
- If the mentor or assessor needs any assistance feel free to contact the Computer Systems Coordinator at VUT. (see top of page)
- To fulfil the requirements of the Diploma: Electrical Engineering: Computer Systems, the student must successfully complete all academic requirements, as well as the three Workplace Based Learning components.
- Graduate attribute 12 (GA12) is further developed in this module, but not evaluated.

Workplace Based Learning 2 (WBL) Registration

Registration procedure:

- This module should be registered at the same time with EIEXC1A and EIPRC4A.

- This project module carries a credit value of 16.

- The minimum required time, according to ECSA, is 240 hours for this module for a 6-month training schedule, and 480 hours for a 12-month training schedule.

Procedure to complete and submit the training schedule:

- Within 14 days of starting with your training in this module, the training schedule report (pages 5 to 7) must be completed and emailed to the WIL coordinator for approval.

- The report must be signed by the mentor and the student (page 7).

Procedure for compiling and submitting the assessment report:

- After completion of each topic, the topic must be assessed by the assessor and signed. (page 10 to 19)

- The assessor must make use of the rubric on page 20 is used when assessing each topic.

- After completion of this module on WBL the assessor must complete the assessor's declaration (page 9).

- The final report for this module (page 8 to 20) must be submitted **by email** to the WBL coordinator **(Mr. KT Nshimba   nshimba@vut.ac.za).**

VAAL UNIVERSITY OF TECHNOLOGY

FACULTY OF ENGINEERING AND TECHNOLOGY

WORKPLACE BASED LEARNING

COMPUTER SYSTEMS ENGINEERING

VAAL UNIVERSITY
OF TECHNOLOGY

Inspiring thought. Shaping talent.

TRAINING SCHEDULE REPORT
WBL 2 (EIEXC2A)

1 GENERAL INFORMATION – TRAINING SCHEDULE REPORT WBL (EIEXC2A)

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	
ASSESSOR	INITIALS & SURNAME:		ACCREDITED ASSESSOR: Y / N	
	E-MAIL:		CELL OR TELEPHONE:	
	QUALIFICATIONS:			
WBL REPORT	START DATE:		END DATE :	

VUT OFFICE USE :

ACCEPTED □   *DECLINED* □

2 **TOPICS SCHEDULED FOR WBL 2 (EIEXC2A)**

The following table shows the possible **applicable** topics that may be included by the company where the workplace based learning takes place. Show the total hours for each topic.

The scheduled topics are on pages 10 to 18. Extra topics that the company may wish to include should be added. The topics numbered 1 to 7 serves as a guide and may be modified by the company. **Topics will however need to be approved by VUT.**

TOPIC NUMBER	CONTENT TOPICS	TIME HOURS
1	**Cloud Computing:** Deployment of cloud-based resources, Deployment of web-based systems	
2	**Design, Development & Implementation of Network Infrastructure:** LAN, WAN, Cloud-based	
3	**Software and Databases Systems:** Development, commissioning, and maintenance.	
4	**IoT Systems:** Design & Prototyping, Configuration & deployment	
5	**Data management:** Backup systems, data security and protection, data management and analysis	
6	**Server infrastructure:** Configuration & Deployment of servers (Linux or Windows), Using automation software to deploy and manage remote servers	
7	**Hardware Design:** Design of hardware systems by making use microcontrollers, sensors and actuators to solve engineering problems.	
8	Other	
9	Other	
10	Other	
	TOTAL Hours	**/480**

WBL SCHEDULE ACCEPTED BY STUDENT:			
NAME:	*SIGNATURE:*		*DATE:*
WBL SCHEDULE COMPILED BY ASSESSOR: :			
NAME:	*SIGNATURE:*		*DATE:*

VAAL UNIVERSITY OF TECHNOLOGY

FACULTY OF ENGINEERING AND TECHNOLOGY

WORKPLACE BASED LEARNING (WBL)

COMPUTER SYSTEMS ENGINEERING

TOPIC ASSESSMENT REPORT
WBL 2 (EIEXC2A)

2 ASSESSOR DECLARATION – ASSESMENT REPORT WBL 2 (EIEXC2A)

STUDENT	**INITIALS AND SURNAME :**	
	VUT - STUDENT NUMBER :	
	ID NUMBER :	
	COMPANY :	
TRAINING PERIOD	**WBL :**	**TO**
		START DATE: *COMPLETION DATE:*
ASSESSOR	**INITIALS AND SURNAME :**	
	CELL OR TELEPHONE NUMBER :	
	E-MAIL:	
ASSESSMENT		

ASSESSOR DECLARATION

I, the above-mentioned assessor, declare that the above-mentioned student has completed this workplace based learning module (WBL) of the qualification in the mentioned period under my supervision.

The student was found competent in the outcomes as specified in the assessment report. I confirm that graduate attribute 12 was further developed with the student in preparation for the evaluation in the project module.

Signature :   *Date:*

VUT OFFICIAL	**FINAL MARK:**	
SIGNATURE:	*DATE:*	

ASSESMENT REPORT AND TRAINING SCHEDULE   WBL 2 (EIEXC2A)

SYLLABUS: COMPUTER SYSTEMS ENGINEERING

TOPIC 1	CLOUD COMPUTING				
After completion of this topic the student should be able to do the following: • Deploy cloud-based resources (e.g. VMs, VNETs, Storage etc) • Deploy of web-based systems using containers (e.g. Docker & Kubernetes)					
Start Date:	*End Date:*		*Total Hours:*		
Topic Mark (Mark with an X using attached rubric attached on page 25) *Assessor Signature*: *Date:*	1	2	3	4	5
Explain how this topic is addressed in the specific workplace.					
Student Signature: *Date:*					
Mentor Signature: *Date:*					

TOPIC 2	DESIGN, DEVELOPMENT & IMPLEMENTATION OF NETWORK INFRASTRUCTURE

After completion of this topic the student should be able to do the following:
- Design networks for SOHO, medium and Enterprise setup.
- Design and deploy cloud-based networks

Start Date:	End Date:	Total Hours:				

Topic Mark (Mark with an X using rubric attached on page 25)

Assessor Signature:

Date:

1	2	3	4	5

Explain how this topic is addressed in the specific workplace.

Student Signature: *Date:*

Mentor Signature: *Date:*

TOPIC 3	SOFTWATE & DATABASE SYSTEMS

After completion of this topic the student should be able to do the following:
- Design desktop and cloud-based application using popular programming languages and frameworks.
- Design databases, both for on premises and cloud usage using popular database systems.

Start Date:	*End Date:*		*Total Hours:*				

Topic Mark (Mark with an X using rubric attached on page 25) *Assessor Signature:* *Date:*	1	2	3	4	5

Explain how this topic is addressed in the specific workplace.

Student Signature:	*Date:*

Mentor Signature:	*Date:*

TOPIC 4	***IoT Systems***

After completion of this topic the student should be able to do the following:
- Design & Prototyping systems that make use of IoT technologies, e.g. smart monitoring, smart farming, smart energy management systems, smart security etc.

Start Date:	*End Date:*	*Total Hours:*				

Topic Mark (Mark with an X using attached rubric page 25) *Assessor Signature:* *Date:*	1	2	3	4	5

Explain how this topic is addressed in the specific workplace.

Student Signature: *Date:*

Mentor Signature: *Date:*

TOPIC 5	**DATA MANAGEMENT**

After completion of this topic the student should be able to:
- Devise solutions for data backup.
- Implement backup solutions for on premisses and cloud storage.
- Implement security mechanisms to protect data.

Start Date:	*End Date:*	*Total Hours:*				

Topic Mark (Mark with an X using attached rubric page 25)						
Assessor Signature:		1	2	3	4	5
Date:						

Explain how this topic is addressed in the specific

Student Signature: *Date:*

Mentor Signature: *Date:*

TOPIC 6	SERVER INFRUSTRUCTURE

After completion of this topic the student should be able to demonstrate the ability to:
- Plan and deploy server infrastructure both on premisses and in the cloud.
- Deploy and configure of server operating systems (Linux and Windows)
- Use automation software to deploy and manage remote servers (Ansible, ARM templates, Terraform etc)

Start Date:	*End Date:*	*Total Hours:*					

Topic Mark   (Mark with an X using attached rubric page 25)

Assessor Signature:		1	2	3	4	5
Date:						

Explain how this topic is addressed in the specific workplace.

Student Signature: *Date:*

Mentor Signature: *Date:*

TOPIC 7	HARDWARE DESIGN

After completion of this topic the student should be able to:
- Design hardware systems by making use microcontrollers, sensors and actuators to solve engineering problems.
- Service and maintenance of existing computer systems hardware

Start Date:	*End Date:*	*Total Hours:*

Topic Mark (Mark with an X using attached rubric page 25)	1	2	3	4	5
Assessor Signature:					
Date:					

Explain how this topic is addressed in the specific workplace.

Student Signature: *Date:*

Mentor Signature: *Date:*

TOPIC 8	

After completion of this topic the student should be able to demonstrate the ability to:
-

Start Date:	*End Date:*	*Total Hours:*				

Topic Mark (Mark with an X using attached rubric page 25)		1	2	3	4	5
Assessor Signature:						
Date:						

Explain how this topic is addressed in the specific workplace.

Student Signature:	*Date:*
Mentor Signature:	*Date:*

TOPIC 9	

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

Start Date:	*End Date:*	*Total Hours:*

Topic Mark (Mark with an X using attached rubric page 25) *Assessor Signature:* *Date:*	1	2	3	4	5

Explain how this topic is addressed in the specific workplace.

Student Signature:	*Date:*

Mentor Signature:	*Date:*

TOPIC 10	

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

Start Date:	*End Date:*	*Total Hours:*				

Topic Mark (Mark with an X using attached rubric page 25) *Assessor Signature:* *Date:*	1	2	3	4	5

Explain how this topic is addressed in the specific workplace

Student Signature: *Date:*

Mentor Signature: *Date:*

APENDIX A

GRADUATE ATTRIBUTE (GA)

Note to Assessor and Mentor

ECSA requires that GA12 be evaluated at the end of the WIL training. This GA must be introduced to the student when starting with WBL1 module, developed further in WBL 2 module, and evaluated in WBL 3 (project module). In this module, there is need for proof of how this GA was further developed. Below are the descriptions of what this GA entails.

Learning outcome: Demonstrate an understanding of workplace practices to solve engineering problems consistent with academic learning achieved. • The balance of investigation and experiment should be appropriate to the discipline. **An investigation or experimental study** should be typical of those in which the graduate would participate in an employment situation shortly after graduation.	
Where is the outcome assessed?	In the final Workplace project report.
How is this outcome assessed?	Students must submit a report, validated by a mentor, demonstrating their capability to: • Utilize computer engineering principles to develop, construct, and configure systems within the workplace-based learning environment. • Employ computer engineering principles for the design or enhancement of existing systems. • Implement computer engineering principles to innovate or improve processes within the

	workplace.
	• Certainly! Here are additional points that build upon the initial requirements, showcasing a comprehensive application of computer engineering principles in a workplace-based learning setting:
	• Analyse and evaluate the performance of implemented systems, employing computer engineering principles to identify optimization opportunities and implement effective solutions.
	• Apply critical thinking and problem-solving skills to troubleshoot and resolve technical issues that arise during the development or operation of systems.
	• Collaborate effectively with cross-functional teams, using computer engineering principles to communicate technical concepts clearly and contribute to interdisciplinary projects.
	• Demonstrate an understanding of industry standards and regulatory requirements relevant to computer engineering, ensuring that all projects comply with these guidelines.
	• Employ computer engineering principles to assess the security implications of systems and processes, implementing robust security measures and protocols to protect organizational data.
	• Integrate sustainability considerations into system design and development, applying computer engineering principles to promote environmental responsibility and resource efficiency.
What is satisfactory performance?	The student must comply with conducting a proper investigation and experiment to uncover the required information. The student should reflect the following in the report: • define the scope, methodology, and literature review, • analyse the results, draw conclusions, provide possible solutions (outcome if experimental), • report on the work in writing, keeping in mind to use appropriate methods/tools. • Include a portion of data/data analysis in the literature review. This graduate attribute is assessed by a comprehensive four (4) level rubric where a minimum set of

outcomes must be met to prove competency. The GA assessment is categorised as follow:

- *Poor* - student does not comply at all,
- *Borderline* - may comply with corrections,
- *Competent* - min to moderate compliance is met,
- *exceed expectation* – max compliance is met.

All objectives must be achieved with at least the foundational level of adherence as specified by the assessment criteria. This involves a detailed evaluation of the necessity for the project. Computer engineering students must comprehend the critical importance of experimental and project-based work, demonstrating proficiency in planning and executing technology-driven projects. In particular, they are expected to:

1. Choose the most appropriate hardware and software tools for conducting research or experimental projects, showcasing the ability to accurately select and utilize the necessary technology with minimal mistakes.

2. Independently set up and conduct experiments or simulations using specified hardware and software, requiring negligible assistance. They demonstrate a significant degree of autonomy in navigating and employing complex computational tools and environments.

3. Analyse, interpret, and draw meaningful insights from data collected during the project. Perform precise calculations or analyses with minor discrepancies.

4. They should also be capable of comparing experimental data with theoretical concepts, acknowledging any discrepancies, measurement inaccuracies, and variables that could influence the outcomes.

	5. Formulate conclusions based on a thorough analysis of all gathered data. The conclusions should be detailed in a coherent paragraph that encapsulates the project's findings, exhibits a logical flow, and suggests avenues for future research or development.
	6. Compile the project's objectives, methodology, and findings into a well-organized technical report. Although the report might omit a few negligible details, it should largely reflect the attributes of a comprehensive and professional document, including being properly bound.
What is the consequence of unsatisfactory performance?	Achieving this attribute is a critical requirement for successfully completing Workplace Based Learning. Non-compliance will result in failure, regardless of whether the aggregate score from all summative assessments is a pass. Students who do not satisfy one or more of the criteria will be afforded a second opportunity, within specified deadlines, to fulfil all requirements for the Graduate Attribute (GA). Should a student fail to meet all criteria after this second chance, they will not pass the module, and their record will indicate 'Fail to meet GA 12'.

APENDIX B

WBL 2   - RUBRIC

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 expect

4 **60-79%**	Good knowledge	Can apply high level theory	Can select and use advanced equipment independently	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 analyse 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