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| **VUT LOGO** |
| **Faculty of Engineering and Technology****Electrical Engineering: Process Control** |
| **Workplace-Based Learning Guide** WBL**Code: EIEXL2A** |
|  **Approved:** Advisory committee meeting**Contents*** Contact Details and General Requirements………………………………………….3
* Registration and Report Submission Instructions……………………………………4
* Training Schedule Report………………………………………………………………5
* Topic Assessment Report………………………………………………………………8
* Workplace Based Learning (WBL) Evaluation Guideline………………………….14
* Appendix A Syllabus………………………………………………………………… 15
 |
| **Contact details** |
| **Department** | **Office** | **e-mail address** | **Telephone** |
| Computer Systems Coordinator | S112 | koosm@vut.ac.za | 016 950 9434 |
| Co-operative Education | N000 | pricilla@vut.ac.za | 016 950 9707 |
| **General requirements** |
| * It is the responsibility of the student to register for WBL before training commences.
* The student will simultaneously register for EIEXL1A, EIEXl2A and EIPRl4A, 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 each relevant topic. 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 the training schedule report (pages 5 to 7), the assessor’s declaration (page 9), as well as the assessment report (page 10 to13).
* If the mentor or assessor needs any assistance feel free to contact the Process control Coordinator at VUT. (see top of page)
* To fulfil the requirements of the Diploma: Electrical Engineering: Process control, the student must successfully complete all academic requirements, as well as the three Workplace Based Learning components.
* The syllabus Appendix A is WBL syllabus for the study fields of Process Control Engineering. The assessor/mentor can schedule the topics for training.
* Topics that are not included in the list of topics in this document but are required by the training company should be added using the blank topic 4 on page 13. Add as many topics as necessary by just copying the blank topic 4 on page 13.
* Graduate attributes GA11 must be covered in this module as part of the requirements of the Engineering Counsel of South Africa (ECSA). The Process Control Engineering Syllabus Appendix A contain a detailed explanation of the GA’s.
* The assessor must also indicate on the topic assessment form, which of the graduate attributes (GA’s) are attained in each topic. Each topic may cover one or more of these GA’s. The requirement is that all four GA’s must be covered in this module.
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| Registration and Report Submission Instructions |
| **Registration of Workplace- Based Learning (WBL)**  Registration procedure: |
| * Registration for the following WBL modules EIEXL1A, EIEXL2A and EIPRJ4A must be done simultaneously.
* This second module EIEXL2A carries a credit value of 16 with a minimum time requirement of 480 hours (approx. 12 weeks).
 |
| **Workplace Based Learning (WBL) Reports** Preparation and submission procedure:* The training schedule report (pages 5 to 7), must be completed and emailed to the VUT Process Control coordinator (Mr. PJ Mitton) as soon as possible after this module of WBL commences.
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| * After completion of each topic, the topic must be assessed and signed (page 9 to 13).
* After completing this module of WBL the assessor must complete the assessor’s declaration (page 9).
* The final report for this module must be submitted by post or in person to the Cooperative Education Office (Room N100) at VUT.Make use of email during covid
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| Vaal University of TechnologyFaculty of Engineering and TechnologyWorkplace based Learning  Process Control Engineering |
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| WBL**Training Schedule Report** **EIEXL2A (480 Hours)** |
| Procedure to complete and submit the training schedule: |
| * Within 14 days after WBL commenced the training schedule report (pages 5 to 7) must be emailed to the relevant VUT WBL Process Control coordinator. (Mr PJ Mitton, email address: koosm@vut.ac.za).
* Complete pages 6 and 7.
* The report must be signed by the mentor and the student (page 7).
* Only the topics that are offered by the company in accordance with their main business must be done. If there are other topics not mentioned in the document it should be added. Topic 4 on page13 is a blank topic and should be used for the additional topics.
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| **1** | **General information – Training SCHEDULE REPORT WBL (EIEXL2A)** |
| **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: |
| **WBL report** Start date:  |  | End date : |
| **VUT Office use :** |  | *Accepted* □ | *Declined* □ |
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| **2** | **Topics scheduled for WBL (EIEXL2A)** |
|  | 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 13. Extra topics that the company may wish to include should be added. The topics numbered 1 to 4 serves as a guide and may be modified by the company. Topics will however need to be approved by VUT. |

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|  | **Topic number** | **Content Topics** | **Time Hours** |
|  |
|  | 1 | Programmable devices |  |
|  | 2 | Industrial systems |  |
|  | 3 | Plant Loop Training |  |
|  | 4 | Other |  |
|  | 5 | Other |  |
|  | 6 | Other |  |
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|  |  | TOTAL Hours | 480 |

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|  | **WBL Training Schedule Report compiled by:** |
|  | *Students signature* | *Date* |
|  | **WBL Training Schedule** **report certified as correct:**  |
|  | *Assessor’s signature* | *Date* |

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| Vaal University of TechnologyFaculty of Engineering and TechnologyWorkplace based Learning (WBL)Process Control Engineering |
| Logocolr |
| WBL**Topic Assessment Report****EIEXL2A (480 Hours)** |
| Procedure to compile and submit the assessment report: |
| * After completion of each topic, the topic must be assessed by the assessor and signed. (page 10 to 19)
* 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 17) must be submitted **by post** or in person to the Cooperative Education department (Room N100) at the VUT. Email during covid to coordinator
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| 2 |  **ASSESSOR DECLARATION – ASSESMENT REPORT WBL 2 (EIEXL2A)** |

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| **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.  |
|  *Signature Date*  |
| **VUT Official**  | **Final mark:** |  |
| *Signature:* |  | ***Date:*** |

#### ASSESMENT REPORT AND TRAINING SCHEDULE WBL 2 (EIEXL2A)

####  Syllabus: Process Control Engineering

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| **TOPIC 1** | **Programmable Devices** |
| After completion of this topic the student should be able to do the following:* Programming, downloading and testing of programs for programmable devices

.  |
| **Start Date:** | **End Date:** | **Total Hours:** |
| **Topic Mark** (Mark with an X using attached rubric page 14)**Assessor Signature**: | 1 | 2 | 3 | 4 | 5 |
| **Graduate attributes**Mark the GA’s addressed in this unit with an X)  (See syllabus Appendix A) | GA 11 |  |  |  |
| **Explain how this topic is addressed in the specific workplace.**(Refer also to the GA’s in the Syllabus Appendix A) Insert more lines if needed |
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| **Student Signature** | **Assessor Signature** |
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| **TOPIC 2** | Industrial systems |
| After completion of this topic the student should be able to do the following:* Develop circuit diagrams and flow diagrams
* Demonstrate the interpretation of circuits and flow diagrams
* Ability to install and commission equipment on a system and do fault finding
 |
| **Start Date:** | **End Date:** | **Total Hours:** |
| **Topic Mark** (Mark with an X using rubric attached page 14)**Assessor Signature*:*** | 1 | 2 | 3 | 4 | 5 |
| **Graduate attributes**Mark the GA’s addressed in this unit with an X)  (See syllabus Appendix A) | GA 11 |  |  |  |
| **Explain how this topic is addressed in the specific workplace.**(Refer also to the GA’s in the Syllabus Appendix A) Insert more lines if needed |
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| **Student Signature** | **Assessor Signature** |
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| **TOPIC 3** | **Plant Loop Training** |
| After completion of this topic the student should be able to do the following:* Understand and work on control systems
* Understanding and demonstrate occupational safety and other legislative requirements for the practise of a learner technician/student
* Understand and demonstrate different ISO standards and how this tie into industry requirements to comply to these standards
* Understand and apply the requirements and steps that need to be followed to do work in the workplace with the permit to work system.
* .
 |
| **Start Date:** | **End Date:** | **Total Hours:** |
| **Topic Mark** (Mark with an X using rubric attached page 14)**Assessor Signature:** | 1 | 2 | 3 | 4 | 5 |
| **Graduate attributes**Mark the GA’s addressed in this unit with an X)  (See syllabus Appendix A) | GA 11 |  |  |  |
| **Explain how this topic is addressed in the specific workplace.**(Refer also to the GA’s in the Syllabus Appendix A) Insert more lines if needed |
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| **Student Signature** | **Assessor Signature** |
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**OTHER TOPICS** (Make as many copies of this blank unit as necessary)

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| **TOPIC 4** |  |
| 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 14)**Assessor Signature*:*** | 1 | 2 | 3 | 4 | 5 |
| **Graduate attributes**Mark the GA’s addressed in this unit with an X)  (See syllabus Appendix A) | GA 11 |  |  |  |
| **Explain how this topic is addressed in the specific workplace.**(Refer also to the GA’s in the Syllabus Appendix A) |
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| **Student Signature** | **Assessor Signature** |
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**WBL - EIEXL2A**

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| **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 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 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 |

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| Logocolr | **Vaal University of Technology** |
| **Faculty of Engineering and Technology** |
| **Department Process Control and Computer Systems Engineering** |
| **Syllabus** |
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| **Instructional offering:** | Work-place-based Learning |
| **Internal Code:** | EIEXL2A |  |
| **Instructional programmes:** | Diploma in Electrical Engineering |
| **Assessment:** | Written Report |
| **NQF Level:**  | 6 |
| **Credits:**  | 16 |
| **Document revision:** | February 2021 |

1. **Syllabus Content**
2. Specific learning content is determined by the Employer. The following represents typical fields of learning content: programmable control devices, industrial control systems, control loops.
3. As follow-up module these fields would typically include the development, building and configuration of systems which may include: Programmable control devices, Industrial control systems, control loops. The installation and configuration of specific employer systems should be included.
4. Another area where students may receive world-place-based exposure is in the, configuration and implementation of IIOT systems.

**2. Learning Outcomes**

After completion of this course the student should be able to demonstrate at least one or more of the following:

* Programming and testing of programs for programmable devices
* Interpretation of process diagrams and flow diagrams
* Ability to install and commission equipment on a system and do fault finding
* Understand components of control systems in an industrial environment.
* Understanding and demonstrate hazardous area requirements.
* Understand and demonstrate different ISO, ISA and company standards compliance.
* Understand and apply the requirements and steps that need to be followed to do work in the workplace with the permit to work system.

**3. References**

**4. Graduate Attributes**

This module aids to assess the following ECSA defined graduate attributes as applicable to work-place-based learning:

**Graduate Attribute 11: Workplace practices**

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

**Note:** The purpose of work-integrated learning is to enable the learner to connect academic learning with workplace practice.

***Range Statement:*** Tasks to demonstrate this attribute may be performed in one or more of the following curriculum types:

1. 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.
2. Problem-based learning: where students work in small self-directed groups to define, carry out and reflect on a task which is usually a real-life problem.
3. Project-based learning: that brings together intellectual enquiry, real world problems and student engagement in meaningful work.
4. Workplace learning: where students are placed in a professional practice or simulated environment within a training programme.
5. Simulated learning.

**5. Graduate attributes assessment**

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| **Graduate Attribute 11: Workplace practices** Demonstrate an understanding of workplace practices to solve engineering problems consistent with academic learning achieved. |
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| Where is outcome assessed? | In the work place. |
| How is this outcome assessed? | Students are required to produce a report that is verified by a mentor illustrating the ability to develop, build and configure process control systems, in which the work-place-based learning takes place. |
| What is satisfactory performance? | Appropriate and applicable control systems can be demonstrated and explained.  |
| What is the consequence of unsatisfactory performance? | Work must be repeated until the appropriate application of theoretical knowledge can be demonstrated. |

**6. Module Credits**

**1 credit =** 30 hours work based learning

**16 credits =** 480 hours work based learning (12 Weeks)

**7. Module Knowledge Profile**

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| **Mathematical****Sciences** | **Natural Sciences** | **Engineering Sciences** | **Engineering Design** | **Computing and IT** | **Complementary Studies** | **Work Integrated learning** |
|  |  |  |  |  |  | 16 |