



EURYDICE

Collaborating towards a future in renewable energy

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CUT / TUT / DUT

WP: 2.3.1

Minimum requirement for placement of students

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1. Introduction

One of the main objectives in the Eurydice project is to enhance the employability of students in the field of renewable energies, based on closer collaboration between university and industry. In specific, work package 2.3 aims to improve the education curricula on diploma, bachelor and postgraduate level by enhancing the aspect of work-integrated-learning (WIL) through industrial experience. This is a timely intervention as the educational structure in South Africa have been revised recently and are currently at the point where students will be entering the industrial workspace.

1.1. Goal

The first step in work package 2.3 is to define the minimum requirements for placing of a student in the renewable energy sector. This should guide and assist in the formulation of curriculum enhancements of the respective UoT qualifications.

1.2. Process

Based on the findings and measures of the status-quo and gap analysis, the project members worked in individual university groups and completed the following sub-tasks,

- CUT compiled a general survey, based on the expectations of the Engineering Council of South Africa (ECSA) for Alternative Sources of Energy Technicians in the workplace.
- Each UoT discussed and completed their individual findings and submitted to CUT.
- An inter UoT workshop, followed where the findings and possible standardization between UoT's were discussed.
- CUT compiled the final document.

2. Industrial expectations

The renewable energy sector in South Africa is relatively new and hence the relevant qualifications and or course content offered by the universities. Very few institutions have delivered qualified students to the RE industry and as a result have no feedback from industry on the performance or deficiencies in the curriculum. In an attempt to quantify the minimum requirements for student placing, the typical tasks of a renewable energy technician and the nature of the renewable energy sector in South Africa were considered. These aspects are defined by the Engineering counsel of South Africa as presented below.

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2.1. Typical tasks of an Alternative Energy Technician

According to ECSA do a qualified “Alternative Sources of Energy Technician” in an industrial environment, conduct research, advise on design and direct the construction, maintenance and repair of renewable energy sources such as wind, solar and wave at the well-defined level.

Practicing Alternative Energy Technicians may concentrate on one or more of the following areas: computer engineering, control and instrumentation engineering, energy management engineering, electrical design engineering, electrical power generation engineering, electromechanical engineering, computer system engineering, software engineering and systems engineering. An Alternative Energy Technician may undertake tasks that include:

- conducting research and developing new or improved theories and methods relating to Alternative Energy Engineering;
- advising on and designing computer-based systems, components, systems equipment, software and distribution centres;
- specifying production and installation methods, materials and quality and safety standards;
- directing production and installation work of computer-based products, software and systems;
- supervising, controlling, developing and monitoring the operation and maintenance of alternative energy systems, software, networks and equipment;
- organising and directing the maintenance and repair of existing computer-based systems, program and equipment;

2.2. Nature and organisation of the industry in SA

Engineering technicians may be employed in both the private and public sectors. In the private sector, Engineering Technicians would mostly be involved in consulting, contracting, or in supplier or manufacturing organisations. The public sector is responsible for service delivery and is usually the client, though in some departments, design and construction is also carried out.

- 2.2.1 **Investigation:** Applicants are expected to be exposed to the technical investigation of equipment, plant and product failure.
- 2.2.2 **Research and development:** Research and development constitute the first stage of development of a potential new service, process or product or the first stages to improve existing services, processes or products.
- 2.2.3 **Process or product design:** This is a process of originating and developing a plan for a product, service or process which can then be implemented.
- 2.2.4 **Risk and impact:** Technical risk is a major factor to be considered in the acquisition of new technologies.

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- 2.2.5 **Engineering project management:** The areas in which Technicians work generally follow a conventional project or product development life cycle model.
- 2.2.6 **Implementation/Commissioning:** In the commissioning of equipment or systems, the Candidate Engineering Technician must demonstrate an understanding of the engineering concepts utilised in the system.
- 2.2.7 **Operations and maintenance:** In the maintenance environment, the Candidate Engineering Technician must demonstrate skills relating to testing, preventative maintenance and financial implications.

Varying degrees of responsibility, applicable to technicians are described as follow:

A: Being Exposed - The candidate/applicant undergoes induction, observes processes, work of competent practitioners. The student carries no responsibility and is not required to complete any task on their own. The mentor explains challenges, formulates a solution and demonstrate the applicable task.

B: Assisting - The candidate/applicant performs specific processes, under close supervision with limited responsibility for the work output. Mentor coaches and offers feedback.

3. Survey

In consideration of 2.1 and 2.2, the environment and expectations of a renewable energy technician were considered. Each UoT classified the relevant tasks with the responsibility levels (A-exposure and B-assisting) they deemed fitting and supportive to their individual qualifications.

3.1. Results

Responses of the individual UoT partners are listed in Table 1. TUT and CUT both offer a Diploma and Bachelors Degree in Electrical Engineering while DUT only offers the Bachelor option.

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Sub task 2.3.1 - Survey of industrial experience requirements for UoT students						
<p>According to the Engineering Council of South Africa (ECSA), Alternative Sources of Energy Technicians conduct research, advise on design and direct the construction, maintenance and repair of renewable energy sources such as wind, solar and wave at the well-defined level. Typical tasks that are expected from an Alternative Energy Technician may include:</p>		<p>Inter-institutional survey to identify their respective expectations for industrial experience requirements when considering Diploma and Bachelor students. Definitive measuring in terms of "responsivity level" proposed as prescribed by ECSA.</p>				
		CUT		DUT	TUT	
Expectations: (Candidate technician)	Description	Diploma students (responsibility level)	Bachelor students (responsibility level)	Bachelor students (responsibility level)	Diploma students (responsibility level)	Bachelor students (responsibility level)
Investigation	Applicants are expected to be exposed to the technical investigation of equipment, plant and product failure.	A	B	B	A	A
Research and development	Research and development constitute the first stage of development of a potential new service, process or product or the first stages to improve existing services, processes or products.	n/a	A	A	n/a	A
Process or product design	This is a process of originating and developing a plan for a product, service or process which can then be implemented	n/a	A	B	A	A
Risk and impact	Technical risk is a major factor to be considered in the acquisition of new technologies.	A	A	B	A	A
Engineering project management	The areas in which Electrical Technicians work generally follow a conventional project or product development life cycle model.	n/a	A	B	A	A
Implementation/Commissioning	In the commissioning of equipment or systems, the Candidate Engineering Technician or person willing to register as a professional technician must demonstrate an understanding of the engineering concepts utilised in the system.	A	B	B	A	B
Operations and maintenance	In the maintenance environment, the Candidate Engineering Technician or persons willing to register as a professional technician must demonstrate skills relating to testing, preventative maintenance end financial implications.	A	B	B	A	A
Nature of work Responsibility and level of support		<p>A: Being Exposed = The candidate undergoes induction, observes processes, work of competent practitioners. No responsibility, except to pay attention. Mentor explains challenges and forms of solution.</p> <p>B: Assisting = The candidate/applicant performs specific processes, under close supervision. Limited responsibility for work output. Supervisor/Mentor coaches, offers feedback.</p>				

Table 1 – Survey completed by the individual UoT's

4. Conclusion

From the individual responses in Table 1, it can be concluded that for diploma students in specific, a responsibility level of "being exposed" is prescribed by CUT and TUT. For the Bachelors program, a higher level of responsibility of "assisting" is expected by all UoTs. The results outline the areas and the level of importance that each institution deems necessary or as minimum requirement for placement of students in the industry. As a next step, these aspects will be addressed in the curriculum enhancements proposed by each institution in WP2.3.2. and WP2.3.3. In terms of industry





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expectations should each university begin to receive feedback from 2022 as some of the first graduates from the revised qualification structure enter the industrial work force.

5. Contact

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