



KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI



GRADUATE ACHIEVEMENT AND STAKEHOLDER PERSPECTIVES ON PROGRAMME EDUCATIONAL OBJECTIVES: COHORT 2021

DIPLOMA IN ELECTRICAL ENGINEERING (GREEN ENERGY)-DEG

ELECTRICAL ENGINEERING DEPARTMENT POLITEKNIK PORT DICKSON

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POLYCC

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PREFACE

This report presents a study on Graduate Achievement and Stakeholder Perspectives on Programme Educational Objectives (PEO) for the 2021 Cohort Diploma in Electrical Engineering (Green Energy) - DEG . It is intended to document the extent to which programme graduates have achieved the intended educational objectives, as assessed through both quantitative and qualitative feedback from key stakeholders.

This report also provides the methodology, data analysis, findings, and recommendations that are essential in supporting continuous quality improvement of the programme. This report is organized into six main sections.

Section 1 introduces the study, covering the programme information, synopsis, and the Programme Educational Objectives (PEO) that form the basis of this evaluation.

Section 2 explains the PEO Achievement Measurement Process, including the achievement indicators, assessment instruments, and study design used to evaluate each of the four PEOs.

Section 3 presents the Results and Analysis, covering findings from the questionnaire method and respondent interview protocol, stakeholder feedback on each PEO, and the determination of the overall PEO achievement percentage for the 2021 Cohort.

Section 4 discusses the Discussion and Conclusion drawn from the study, summarizing key insights and their implications for the programme.

Section 5 lists the References used to support this study.

Section 6 contains the Report Verification, confirming the authenticity and accuracy of the findings presented.

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1.0 INTRODUCTION

1.1 Introduction

The Engineering Technology Accreditation Council (ETAC) is a professional body responsible for all engineering programs in Malaysia, the offering institution is required to implement the Outcome-Based Education or the OBE system. The OBE is an educational process which is based on trying to achieve certain specified outcomes in terms of individual student learning. Thus, having decided what are the key things students should understand and be able to do or the qualities they should develop, both structures and curricula are designed to achieve those capabilities or qualities. The designing process involves restructuring of curriculum, assessment and reporting practices in education to reflect the achievement of high order learning and mastery rather than accumulation of course credits.

In general, the OBE assessment includes three types of outcomes/objectives:

- 1) The Course Learning Outcome (CLO) - being assessed during semester
- 2) The Programme Learning Outcome (PLO) - being assessed at the end of their four-year study and
- 3) The Program Educational Objectives (PEO) - being assessed after 3-5 years of their graduation date.

The PEO are specific goals consistent with the mission and vision of the expressed interest of programme stakeholders describing expected achievements of graduates in their career and professional life after graduation. Criteria of good PEOs are such as distinctive, specific, measurable, achievable, result oriented and having a time frame.

Vision and Mission

Department of Polytechnic and Community College Education (DPCCE) Vision Statement:

To be the Leading-Edge TVET Institution

DPCCE Mission Statement:

- 1) To provide wide access to quality and recognized TVET programmes.
- 2) To empower communities through lifelong learning

- 3) To develop holistic, entrepreneurial, and balanced graduates
- 4) To capitalize on smart partnerships with stakeholders

Port Dickson Polytechnic (PPD) Vision

To be a towering TVET institution globally.

PPD Mission

- 1) Producing quality, holistic and well-balanced TVET graduates with entrepreneurship in order to fulfil the needs of the nation.
- 2) Developing and sustaining smart partnerships with relevant parties locally and internationally.
- 3) To benefit society through education, research and innovation.

PPD Mission Statement

- 1) To produce quality, holistic, and well-balanced TVET graduates with entrepreneurship to fulfil the needs of the nation.
- 2) To develop and sustain smart partnerships with relevant parties locally and internationally.
- 3) To benefit society through education, research and innovation.

The relationship between the PPD mission and the DPCCE mission is depicted in Table 1.1.

Table 1.1: Relation between PPD Missions and DPCCE Missions

DPCCE Mission		PPD Mission		
		Quality, holistic, and well-balanced TVET graduates with entrepreneurship	Develop and sustain smart partnerships with relevant parties locally and internationally	Benefit society through education, Research and innovation
1	To provide wide access to quality and recognized TVET programmes.			√

DPCCE Mission		PPD Mission		
		Quality, holistic, and well-balanced TVET graduates with entrepreneurship	Develop and sustain smart partnerships with relevant parties locally and internationally	Benefit society through education, Research and innovation
2	To empower communities through lifelong learning			√
3	To develop holistic, entrepreneurial, and balanced graduates	√		
4	To capitalize on a smart partnership with stakeholders		√	

1.2 Programme Information

Electrical engineering is the field of study which generally deals with the application of electrical and electronics towards designing, testing and development of circuitry and equipment for well-defined engineering activities. It requires the application of scientific and engineering knowledge and methods combined with practical skills in supporting well-defined engineering activities to prepare for their future role in the industry.

The electrical engineering diploma graduates of the Polytechnic's Ministry of Higher Education are exposed to a comprehensive curriculum consisting of courses in personal development, mathematics, science, electrical disciplines and workplace competencies requirements. Graduates of the electrical engineering diploma programme will be equipped with specialized knowledge and skills which include power engineering, green technology, energy efficiency, computer technology, communication, medical electronics, optoelectronic and industrial automation.

The Diploma in Electrical Engineering (Green Energy) (DEG) is a three-year full-time programme comprising of five semesters coursework with one full semester of industrial training.

1.2.1 Synopsis

The DEG programme is design to covers broad discipline of electrical engineering, with specialization emphasis on the field of green energy. The broad based electrical engineering which includes electrical and electronic principle, computer fundamentals and programming, semiconductor devices, electrical wiring, power system and computer aided design provides versatility to the graduates. Towards the end of the programme, students are equipped with specialization courses which include Fundamental of Renewable Energy, Green Energy System, Energy Efficiency and Management and Green Energy System Integration.

1.3 Programme Educational Objectives

The PEO are statements that describe the expected achievements of graduates in their careers and professional life within three to five years after graduation. Table 1.2 shows the PEOs curriculum version for June 2014, June 2019 and 2024. The measurement of PEOs in this study is based on the PEO 2019 curriculum version, which serves as the reference framework for evaluating graduate achievement in relation to career and professional development outcomes after graduation.

Each PEO for the DEG programme is designed with clearly defined performance indicators that align with the PLOs. These indicators serve as measurable elements that reflect the intended achievements of graduates within 3-5 years after completing the programme. The alignment between PEOs and PLOs ensures that the programme outcomes translate effectively into long-term graduate success, encompassing technical competence, societal contribution, entrepreneurship, and continuous professional development.

Table 1.2: PEOs Description

PEO version June 2014	PEO version June 2019	PEO version 2024	Indicator / Variable measured	Description
PEO 1: Knowledgeable and technically competent in electrical and electronic discipline and able to adapt themselves with new technological challenges in electrical and electronic contribute effectively as a team member with the capability of being a leader	PEO 1: Practicing technician in electrical engineering-related field	PEO 1: Practicing technician in electrical engineering-related field	Technician in the Electrical and Electronic field	Describes a technician who works in any industry and has a job function in the electrical or electronic discipline.
PEO 2: Effective in communication and contribute effectively as a team member with the capability of being a leader	PEO 2: Contributing to society with professional ethics and responsibilities	PEO 2: Contributing to society with professional ethics and responsibilities	Role of graduates	Describes the graduate's involvement in community activities, which includes engineering and non-engineering work related to society, health, and safety. During the activities, the graduate instils awareness of the safety and health culture and suggests environmental and environmental sustainability solutions to the community. In performing the activities, the graduates adhere to professional ethics and responsibilities by following the rules and regulations of the field.

PEO version June 2014	PEO version June 2019	PEO version 2024	Indicator / Variable measured	Description
PEO 3: Capable to solve electrical and electronic problems innovatively, creatively and ethically with social responsibility towards developing country and community	PEO 3: Engaging in enterprising activities that apply engineering knowledge and technical skills	PEO 3: Engaging in enterprising activities that apply engineering knowledge and technical skills	Enterprising Activities	Describes the enterprising activities that require effective communication and contribution from a team member. Enterprising activities involve business in engineering, research, and development (R&D), and technical projects. Enterprising activities can be online or offline businesses. They can also be pursued full-time or part-time.
PEO 4: Able to demonstrate entrepreneurship skills and recognize the needs of life-long learning for successful career advancement	PEO 4: Engaging in activities to enhance knowledge for successful career advancement	PEO 4: Engaging in continuous professional development in response to technological and social challenges.	Career Advancement	Continuous Professional Development (CPD) refers to the ongoing process of acquiring new knowledge, skills, and competencies to stay relevant in an ever-evolving world. As technology advances and societal expectations shift. Students must adapt to remain competitive and effective in their fields.

The relationship between each PEO, its corresponding PLOs, and the key area of assessment is summarised in Table 1.3. This mapping serves as a fundamental reference in assessing the extent to which the programme has successfully produced well-rounded graduates, while also supporting curriculum improvement through feedback integration and stakeholder engagement.

Table 1. 3: PEO-PLO Mapping and Indicators

PEO	Indicator Measured	Assessment Focus
PEO 1	PLO1 – PLO5	Application of engineering knowledge, problem solving, design solutions, investigations, and use of modern engineering tools in the E&E field
PEO 2	PLO6 – PLO8	Professional ethics, societal responsibility, safety, legal awareness, and sustainability considerations in engineering practice
PEO 3	PLO9-PLO 11	Teamwork, communication, leadership, engineering management, and involvement in technical/entrepreneurial activities
PEO 4	PLO12	Lifelong learning through further studies, professional certification, and continuous career development

PEO 1 focuses on the application of engineering knowledge and technical competencies in the Electrical and Electronic (E&E) field. It is mapped to PLO1 to PLO5, which cover engineering knowledge, problem analysis, design/development of solutions, investigation skills, and the use of modern engineering tools. The main assessment focus for this PEO is the graduates' ability to apply technical knowledge effectively in industry practice, particularly in solving engineering problems and performing technical tasks.

PEO 2 emphasizes graduates' ability to demonstrate professional ethics, social responsibility, and awareness of sustainability in engineering practice. It is linked to PLO6 to PLO8, which include understanding societal, health, safety, legal, and cultural issues, evaluating sustainability impacts, and demonstrating ethical responsibilities. The assessment of this PEO focuses on graduates' behaviour in relation to ethical practice, safety compliance, and contribution to sustainable engineering solutions.

PEO 3 highlights graduates' capabilities in teamwork, communication, leadership, and engineering management. This PEO is mapped to PLO9 to PLO11, which cover effective functioning as an individual and team member, effective communication in engineering activities, and application of engineering management principles. The performance indicators include participation in team-based projects, communication effectiveness, leadership roles, and involvement in technical or entrepreneurial activities.

PEO 4 emphasizes continuous professional development and lifelong learning. It is aligned with PLO12, which focuses on the ability to engage in independent and continuous learning in specialized technical knowledge. The assessment criteria for this PEO include further education, attainment of professional certifications, and career progression such as promotions or advancement into senior technical roles.

2.0 PEO ACHIEVEMENT MEASUREMENT PROCESS

PEOs are broad statements that describe the expected career and professional accomplishments of graduates after completing an academic programme. They are formulated to align with the institution's vision and mission while addressing the needs and expectations of industry, society, and national educational aspirations. PEOs are crucial in ensuring that education in a country does not solely focus on theory but also prepares graduates to face the realities of their professional careers. With proper implementation of PEOs, a country can develop a more effective, relevant, and highly competitive educational system. Therefore, the PEO measurement process needs to be carried out by collecting data from alumni, industry and relevant stakeholders. The measurement data, along with triangulation processes, are used to enhance the quality of education so that it aligns more closely with the demands of the job market. A well-executed PEO measurement process helps ensure that graduates possess skills that meet the needs of the current era.

2.1 Introduction

The PEO achievement measurement process is conducted for alumni of the Department of Electrical Engineering, Politeknik Malaysia, who have graduated within the past 3 to 5 years. The process begins with the identification of PEO achievement indicators. These indicators encompass career success and personal development. Subsequently, data is collected through surveys conducted among alumni. The data is then analysed and evaluated to determine the effectiveness of the programme. Follow-up actions include a triangulation process, which involves presenting the PEO achievement analysis to stakeholders such as the Industry Advisory Panel (IAP) and alumni. Finally, reporting and documentation are carried out as part of the quality management and accreditation process. This systematic approach ensures that the academic programme remains relevant and effective in achieving its long-term educational objectives.

2.2 PEO Achievement Indicators

In this context, recommendations from the program's industrial advisors and alumni to improve the PEOs are highly relevant and timely. They aim to enhance the quality of education and strengthen graduates' capabilities in the electrical engineering industry.

These criteria are developed through consultations with industry stakeholders, alumni and the Programme Advisory Committee (PAC), while remaining aligned with national accreditation standards and the principles of OBE. The recommendations from the IAP and alumni regarding the Key Performance Indicator (KPI) for PEOs achievement were discussed and presented in joint meetings on May 5, 2026 (cohort 2021), where a final decision on the targets was established. The results of the discussions and consultations determined that the achievement percentage would serve as a benchmark for evaluating and measuring the success of the PEOs in future cohorts.

Each PEO is assigned a target percentage that represents the minimum level of success expected for the cohort. A PEO is considered achieved when the percentage of graduates meeting the defined expectations equals or exceeds the set target. These criteria are not only used to assess the effectiveness of the programme in preparing graduates for the workforce and lifelong learning, but also to support continuous quality improvement efforts in curriculum development.

Additionally, setting targets provides an opportunity to enhance assessment methods by focusing on objective long-term measurements. This ensures that every decision made over time is based on strong, accurate, and accountable data. This strategy is essential to ensure that the PEO program progresses consistently toward more effective and sustainable goal achievement. More detailed information on the KPI percentage for the 2021 Cohort can be found in Table 2.1, serving as a critical guideline for continuous improvement in Polytechnic academic programs and future graduate success.

Table 2.1: Target KPI for PEOs for Cohort 2021

PEO	Statement	% Target KPI
		2021 Cohort
PEO 1	practicing technician in electrical engineering related field	> 50
PEO 2	contributing to society with professional ethic and responsibilities	> 65

PEO	Statement	% Target KPI
		2021 Cohort
PEO 3	engaging in enterprising activities that apply engineering knowledge and technical skills	> 40
PEO 4	engaging in activities to enhance knowledge for successful career advancements	> 45

2.3 Assessment Instruments

The assessment of PEOs for the DEG programme is conducted systematically to determine the level of achievement among graduates. Each PEO was associated with specific performance indicators and assessed using a set of structured instruments, including alumni questionnaires, employer feedback forms, and triangulation during advisory panel discussions. The aim was to evaluate how well the graduates met the intended objectives based on set performance targets.

Questionnaire instruments are used to obtain data to answer the following objectives:

- i. Addressing curriculum feedback requirements in terms of improving PEO program achievement.
- ii. Discuss how to calculate the percentage of PEO achievement targets that match ETAC Criterion 1.
- iii. Discusses programme improvement and planning in terms of enhancing PEO, PLO, Graduate Employability, and Graduate on Time accomplishment for their respective programmes.

Once finalized, the survey instrument was distributed to the target respondents' students who graduated in the 2021 cohort. The measurement process was conducted from Feb 7, 2026 to Feb 28, 2026. The instrument was distributed online using the Google Form platform to ensure easy access, a high response rate, and more efficient data processing. During this period, students were briefed on the purpose of the study and the importance of their participation in the programme quality evaluation process. Periodic reminders were also sent

to encourage participation. This step was crucial in ensuring the reliability of the data collected before the data analysis and PEO achievement reporting process was conducted.

2.4 Study Design

This study adopts a quantitative, survey-based research design to evaluate the achievement of PEOs among graduates of the Department of Electrical Engineering at Malaysian Polytechnics. The design focuses on collecting empirical data from alumni who graduated within three to five years, as well as input from employers and other relevant stakeholders. The primary instrument used is a structured questionnaire consisting of items aligned with each PEO, designed to assess various aspects such as work in field (PEO 1), role of graduates (PEO 2), enterprising activities, research and development, R&D (PEO 3), and activities enhancing knowledge (PEO 4). The study involves a two-phase distribution process, followed by systematic data analysis to identify trends, evaluate programme effectiveness, and support continuous quality improvement (CQI). This design ensures a reliable and valid approach to measuring long-term educational outcomes and graduate performance in alignment with institutional goals.

2.4.1 PEO 1: Practicing technician in electrical engineering-related field

The measurement of PEO 1 as illustrated in the flowchart in the Figure 2.1 is based on the responses to Item 1 until Item 3 as described below:

- Item 1: Are you working/have you ever worked in an electrical/electronic engineering related field ?
- Item 2: Have you ever applied/ practised any electrical/electronic knowledge in your job scope ?
- Item 3: Are you able to perform technical tasks in the field of electrical/electronic engineering effectively ?

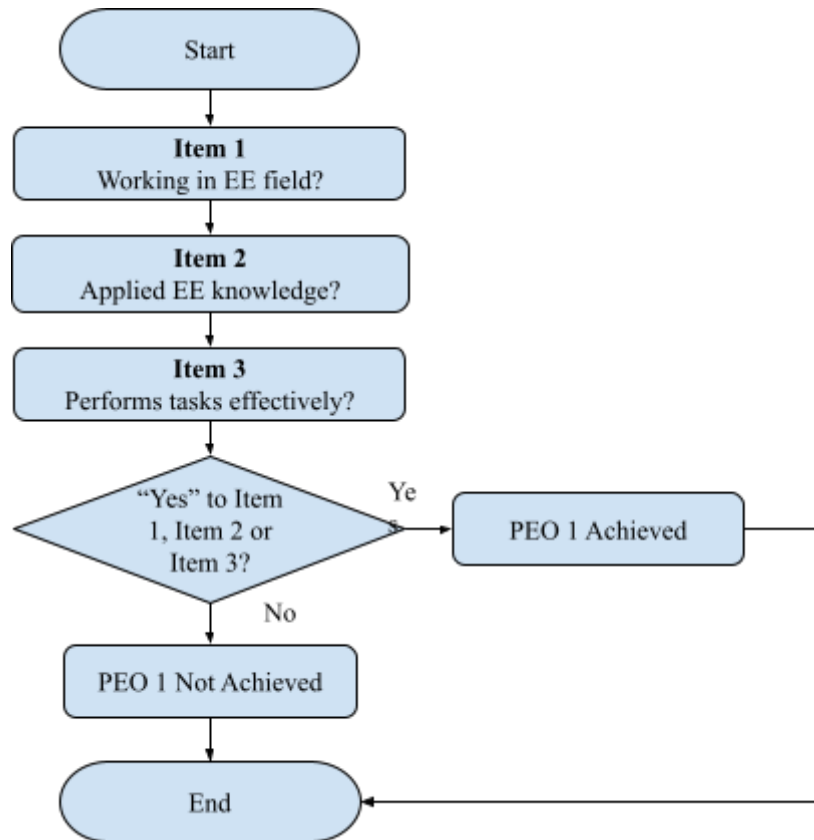


Figure 2.1: Flowchart Measurement of PEO 1

The measurement of PEO 1 is based on responses to three items. Item 1 asks whether the respondent is currently employed or has previously worked in a field related to electrical or electronic engineering. Item 2 asks whether they apply electrical or electronic knowledge within their current job scope. Item 3 asks whether they are able to perform technical tasks in the field of electrical or electronic engineering effectively.

A graduate is considered to have achieved PEO 1 if they answer "Yes" to at least one of the three items. This OR-based logic ensures that graduates who may not be directly employed in an engineering role, but still utilise their technical knowledge in their work, are duly recognised. For instance, as illustrated in Table 2.2, a respondent who answered "No" to Item 1 but "Yes" to both Item 2 and Item 3 is still classified as having achieved PEO 1, reflecting the inclusive nature of this evaluation approach.

Table 2.2: Example Respondent Combination and PEO 1 outcome

Respondent	Item 1	Item 2	Item 3	PEO 1 Outcome
Respondent 1	Yes	Yes	Yes	Achieved
Respondent 2	Yes	No	No	Achieved
Respondent 3	No	Yes	No	Achieved
Respondent 4	No	Yes	Yes	Achieved
Respondent 5	No	No	Yes	Achieved
Respondent 6	No	No	No	Not Achieved

2.4.2 PEO 2: Contributing to society with professional ethic and responsibilities

The measurement of PEO 2 as illustrated in the flowchart in the Figure 2.2 is based on the responses to Item 1 until Item 3 as described below:

- Item 1: Are you practise ethical conduct and professional responsibility when working in a team at an educational institution or in the workplace?
- Item 2: Are you a member of any professional body or international society or regulatory body (e.g: BEM/ MBOT/ IEEE / IEM/ MySet/ CIDB/NIOSH)?
- Item 3: Have you ever involved in any community or social activities (e.g: communal work / Corporate Social Responsibility activities / social work / NGOs)?

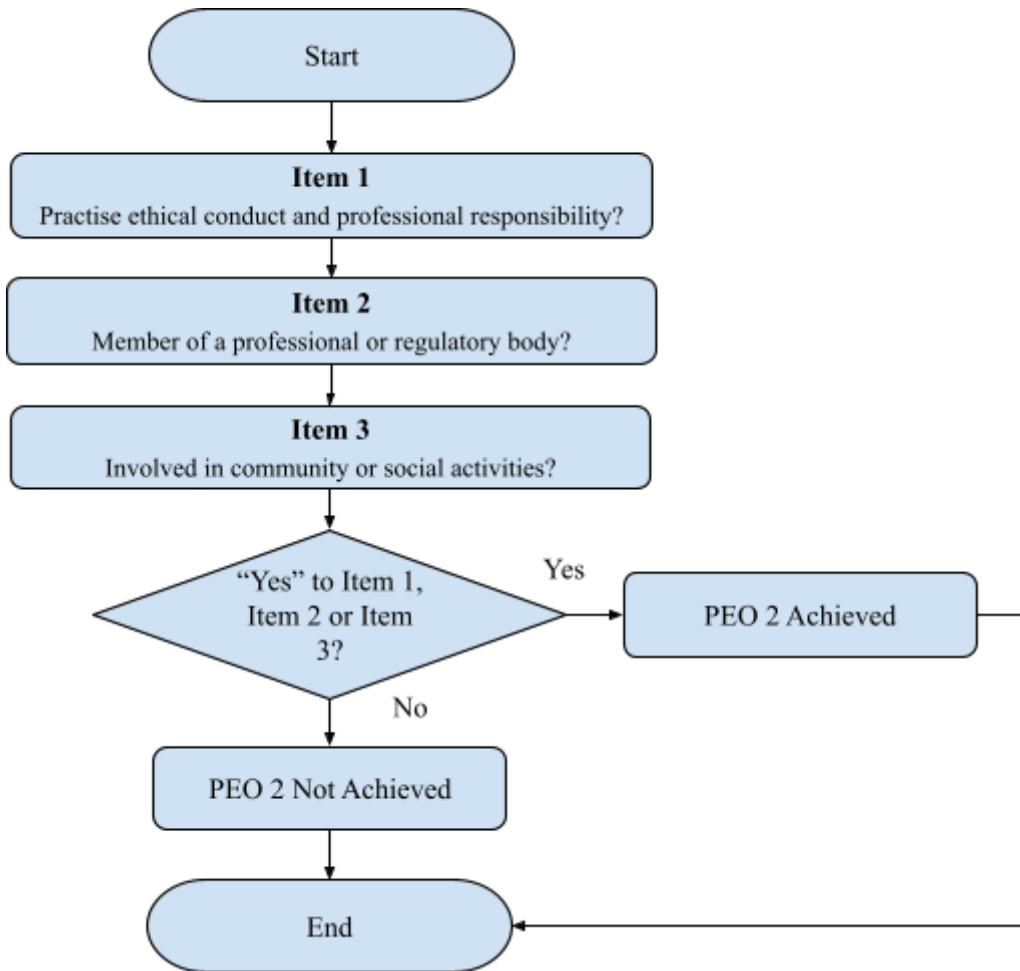


Figure 2.2: Flowchart Measurement of PEO 2

The measurement of PEO 2, which evaluates the role of graduates in their professional and societal contributions, is based on responses to three different items. A graduate is considered to have achieved PEO 2 if they answer "Yes" to at least one of the three items. Each item represents a different dimension of graduate involvement including ethical practices (Item 1), professional membership (Item 2) and participation in community or social activities (Item 3).

Table 2.3: Example Respondent Combination and PEO 2 outcome

Respondent	Item 1	Item 2	Item 3	PEO 2 Outcome
Respondent 1	Yes	Yes	Yes	Achieved
Respondent 2	Yes	No	No	Achieved
Respondent 3	No	Yes	No	Achieved
Respondent 4	No	Yes	Yes	Achieved
Respondent 5	No	No	Yes	Achieved
Respondent 6	No	No	No	Not Achieved

The example Table 2.3 illustrates how different combinations of responses determine the outcome. For instance, Respondent 1 is counted under PEO 2 for answering “Yes” to all items, while Respondent 2 meets the criteria through “Yes” responses to Items 1 only. In contrast, Respondent 6, who answered “No” to all items, does not meet PEO 2 outcome achieved. This comprehensive approach ensures a broader assessment of graduate contributions beyond technical work, capturing elements of professionalism, ethics, leadership, and community involvement.

2.4.3 PEO 3: Engaging in enterprising activities that apply engineering knowledge and technical skills

The measurement of PEO 3, which focuses on graduates’ involvement in entrepreneurship, R&D, is based on responses to three key items, namely Item 1, Item 2, and Item 3 as described below:

- Item 1: Have you ever engaged in entrepreneurship activities in the field of electrical / electronic engineering, either full-time or part-time, online or offline?
- Item 2: Have you ever involved in research and development (R&D) of any product/service/system/technical project? (e.g. market research, product quality improvement, business innovation, process improvement, design)
- Item 3: Have you ever participated in seminars, conferences, workshops, or competitions promoting entrepreneurship/ research and development (R&D)/ innovation in the field of electrical / electronic engineering?

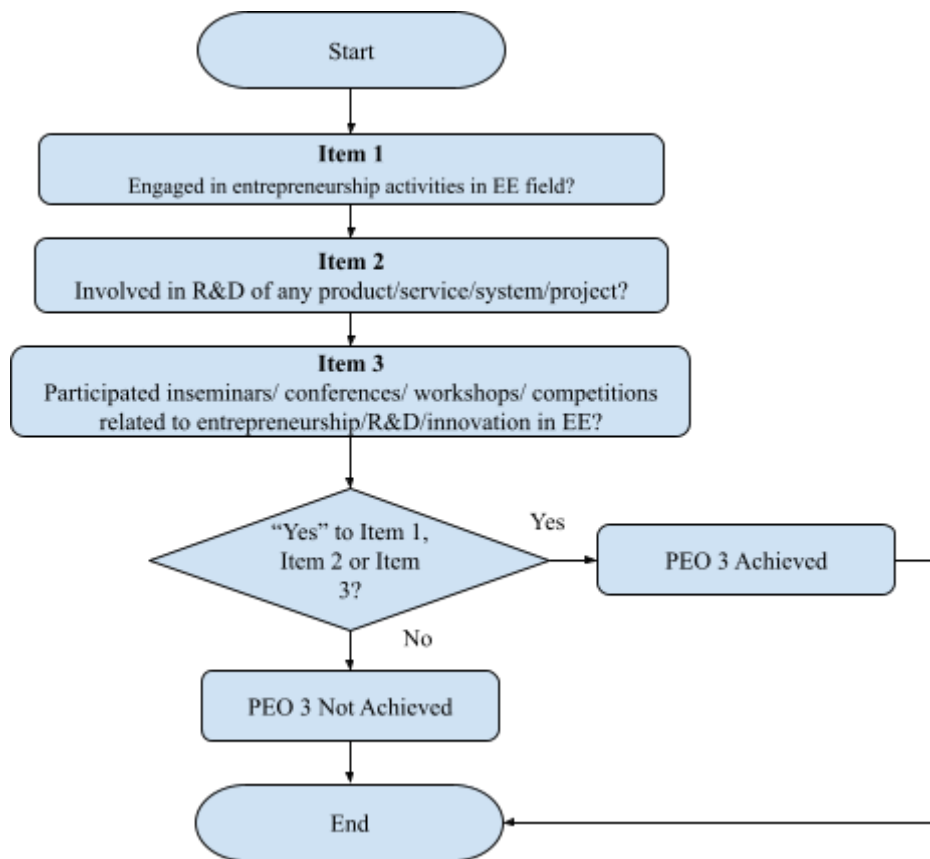


Figure 2.3: Flowchart Measurement of PEO 3

The measurement of PEO 3 is based on responses to three items. Item 1 asks whether the respondent is involved in any form of entrepreneurship activities in the field, either online or offline. Item 2 asks whether they are ever involved in R&D of any product/ service/ system/ project? Item 3 asks whether they participated in seminars/ conferences/ workshops/ competitions related to entrepreneurship, R&D or innovation in the EE field.

A graduate is considered to have achieved PEO 3 if they answer "Yes" to at least one of the three items. The decision logic is clearly shown in the flowchart in Figure 2.3, and the summary Table 2.4 at the bottom provides examples: Respondent 1 is counted achieved under PEO 3 by meeting all criteria, while Respondent 2 qualifies through Engaged in entrepreneurship activities in EE field (Item 1). Respondent 6 , who does not meet any path, is not counted as achieved. This structured approach ensures that graduates' entrepreneurial and research contributions are accurately recognized whether through business ventures or innovation-driven activities.

Table 2.4: Example Respondent Combination and PEO 3 outcome

Respondent	Item 1	Item 2	Item 3	PEO 3 Outcome
Respondent 1	Yes	Yes	Yes	Achieved
Respondent 2	Yes	No	No	Achieved
Respondent 3	No	Yes	No	Achieved
Respondent 4	No	Yes	Yes	Achieved
Respondent 5	No	No	Yes	Achieved
Respondent 6	No	No	No	Not Achieved

2.4.4 PEO 4: Engaging in activities to enhance knowledge for successful career advancement

Figure 2.4 illustrates the measurement flowchart for PEO 4, which focuses on graduates' engagement in knowledge enhancement and career advancement activities. The measurement of PEO 4 is assessed through three items, where Items 1 and 2 are dichotomous (Yes/No) questions, while Item 3 employs a multiple-response format allowing respondents to select all applicable options. The item is as described below:

Item 1: Have you ever participated in any courses or activities to enhance your knowledge of new technology?

Item 2: Do you hold any professional certification?

Item 3: What are your achievements to date? (*You can select more than one answer option:)

Item 1 asks whether the graduate has ever participated in any courses or activities aimed at enhancing their knowledge of new technology. This item is designed to capture the graduate's commitment to continuous learning and self-improvement beyond formal education, which is a key indicator of lifelong learning behaviour. Item 2 asks whether the graduate currently holds any professional certification. Professional certification serves as tangible evidence that a graduate has pursued and attained a recognised standard of competency in their field, reflecting their commitment to professional development. Item 3 asks graduates to identify their achievements to date by selecting all applicable options from the following: salary increase, promotion, own business, further education, and not applicable. A multiple-response format is adopted for this item because graduate achievements are not mutually exclusive — a respondent may have simultaneously received a promotion and

pursued further education. Restricting the response to a single choice would underrepresent the breadth of graduate accomplishments.

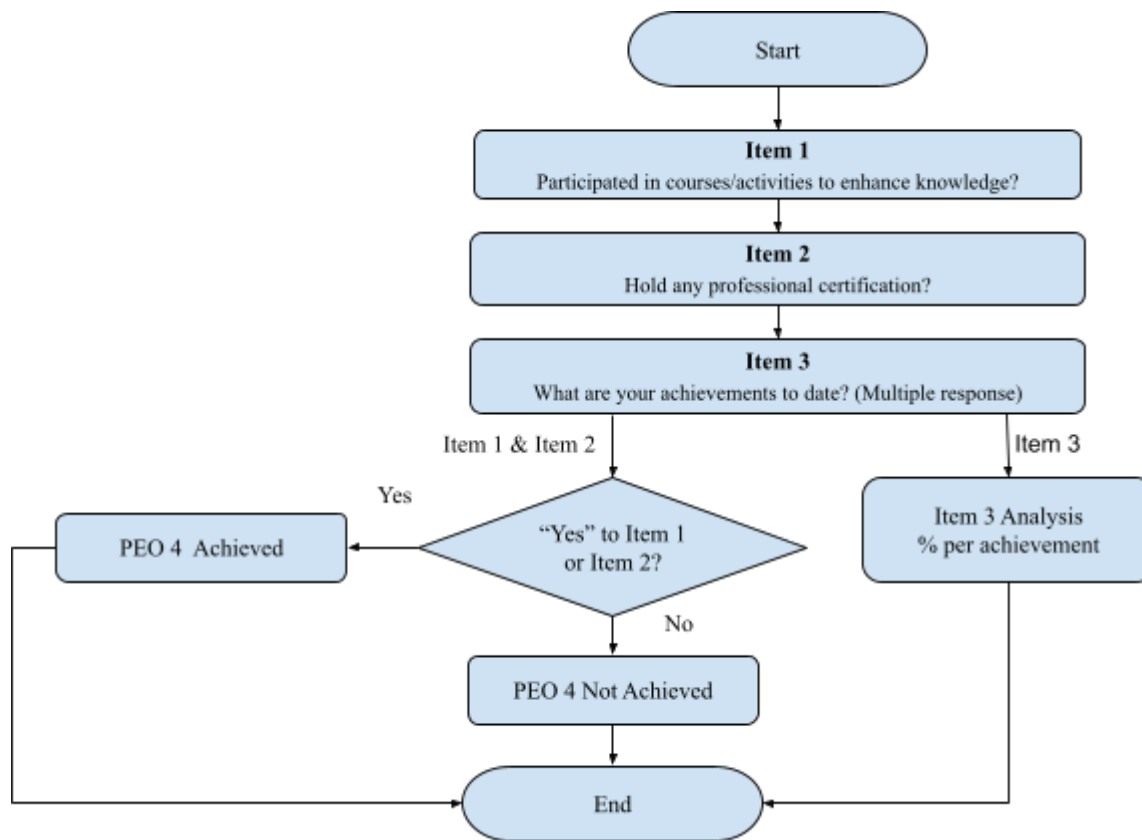


Figure 2.4: Flowchart Measurement of PEO 4

For Items 1 and 2, an OR-based decision rule is applied. A graduate is considered to have achieved PEO 4 if they respond "Yes" to either Item 1 or Item 2, or both. This approach acknowledges that graduates may demonstrate lifelong learning through different pathways — some through active participation in training and upskilling activities, and others through the attainment of formal professional certifications. Requiring both conditions to be met simultaneously would be overly restrictive and may exclude graduates who are genuinely committed to continuous professional development through one of these two legitimate pathways.

An example in Table 2.5 shows how responses are interpreted: if a graduate answers "Yes" to Item 1 but "No" to Item 2, they are still considered to have achieved PEO 4. This structure ensures that any valid form of engagement in professional or academic development is recognized as fulfilling the objective of continuous improvement and career growth.

Table 2.5: Example Respondent Combination and PEO 4 outcome

Respondent	Item 1	Item 2	PEO 4 Outcome
Respondent 1	Yes	Yes	Achieved
Respondent 2	Yes	No	Achieved
Respondent 3	No	Yes	Achieved
Respondent 4	No	No	Not Achieved

For Item 3, since respondents may select more than one option, the data is analysed by calculating the response percentage for each option independently. Each option is treated as a separate binary variable, and its frequency is expressed as a percentage of the total number of respondents. The formula applied is:

$$\text{Percentage for each option (\%)} = (\text{Number of respondents who selected the option} \div \text{Total number of respondents}) \times 100$$

Note that the sum of percentages across all options will exceed 100% due to the multiple-response nature of the item. This is expected and acceptable in multiple-response analysis. Results are reported individually for each category — salary increase, promotion, own business, further education, and not applicable — to provide a comprehensive profile of graduate achievements.

3.0 RESULTS AND ANALYSIS

This PEO review analysis was developed based on two sources of data. The first source comprises questionnaire responses collected from graduates of the Electrical Engineering Department who completed their studies in the 2021 cohort. The second source consists of interview findings obtained from industry advisers appointed by the department for each programme. Together, these two data sources provide a comprehensive basis for evaluating and reviewing the achievement of the Programme Educational Objectives.

3.1 Analysis of PEO of Questionnaire Method

For the DEG program, a total of 54 graduates were recorded from the 2021 cohort, based on data obtained from the Sistem Pengurusan Maklumat Politeknik (SPMP), Politeknik Port Dickson. Out of these, 54 alumni responded to the PEO survey. This results in a response rate of 100%. As the target is to achieve a full 100% response rate, the DEG program meets the required respondent percentage. Additionally, Table 3.1 presents the overall distribution of respondents by gender for DEG programs.

Table 3. 1: Total respondents by gender

Programme	Male	Female	Total respondent	Total graduates	Percentage of Respondents (%)
DEG	46	8	54	54	100%

Source of graduates: SPMP, Politeknik Port Dickson

3.1.1 PEO 1: Practicing Technician in Electrical Engineering-Related Field

PEO 1 represents graduates working as practicing technicians in electrical and/or electronic engineering fields, which is a key measure of the program's effectiveness. Table 3.2 presents the response distribution for each of the three items used to measure PEO 1. The findings are as follows:

- Item 1 :Worked in electrical/electronic engineering field: 46 respondents (85%) answered "Yes", while 8 respondents (15%) answered "No". This indicates that approximately two-thirds of graduates are directly employed in the electrical or electronic engineering field.
- Item 2 :Applied electrical/electronic knowledge: 50 respondents (93%) answered "Yes", while 4 respondents (7%) answered "No". This suggests that a large majority of graduates actively apply their technical knowledge in their current work scope, regardless of whether they are directly employed in the engineering field.
- Item 3 :Performed technical tasks in the field: 49 respondents (91%) answered "Yes", while only 5 respondents (9%) answered "No". This is the highest achievement rate among the three items, indicating that most graduates are capable of performing technical tasks effectively in their respective roles.

Table 3. 2: Percentage achievement of by element in PEO 1

PEO 1	Item/ Element	Achievement			
		Yes	%	No	%
Practicing technician in electrical engineering related field	Worked in electrical/electronic engineering field	46	85%	8	15%
	Applied electrical/electronic knowledge	50	93%	4	7%
	Performed technical tasks in the field	49	91%	5	9%

Based on Table 3.3 a graduate is classified as having achieved PEO 1 if they answered "Yes" to at least one of the three items. Out of 54 respondents, 51 graduates (94%) were classified as having achieved PEO 1, while only 3 graduates (6%) were classified as not having achieved PEO 1, having answered "No" to all three items. This is clearly illustrated in the pie chart, which shows 94% working in the field against 6% not working in the field.

The overall PEO 1 achievement rate of 94% comfortably exceeds the Key Performance Indicator (KPI) target of more than 50% for the 2021 cohort, demonstrating that the

programme has successfully produced graduates who are practising as technicians in the electrical engineering related field.

Table 3. 3: Percentage achievement of PEO 1

PEO 1	KPI 2021 Cohort	Analysis PEO 1	Respondent	Achievement (%)
Practicing technician in electrical engineering related field	>50%	Working in field	51	94%
		Not working in field	3	6%



Figure 3. 1: Percentage achievement of PEO 1

3.1.2 PEO 2: Contributing to society with professional ethics and responsibilities

PEO 2 represents graduates who contribute to society with professional ethics and responsibilities, reflecting the programme's commitment to producing graduates who are not only technically competent but also ethically grounded and socially responsible. Table 3.4 presents the response distribution for each of the three items used to measure PEO 2. The findings are as follows:

Item 1 :Ethical teamwork & professional responsibility: All 54 respondents (100%) answered "Yes". This indicates that all graduates practise ethical conduct and professional responsibility in their workplace or educational setting, reflecting a strong ethical foundation instilled by the programme.

- Item 2 :Professional membership: 29 respondents (54%) answered "Yes", while 25 respondents (46%) answered "No". This suggests that while a portion of graduates have joined professional or regulatory bodies such as BEM, IEM, or IEEE, almost half have yet to attain formal professional membership, which may reflect the early stage of their careers.
- Item 3 : Community & social involvement: 32 respondents (59%) answered "Yes", while 22 respondents (41%) answered "No". This indicates an equal split among graduates in terms of participation in community or social activities, suggesting that involvement in such activities is moderate among the 2021 cohort.

Table 3.4: Percentage achievement by element in PEO 2

PEO 2	Element	Achievement			
		Yes	%	No	%
Contributing to society with professional ethic and responsibilities	Ethical teamwork & professional responsibility	54	100%	0	0%
	Professional membership	29	54%	25	46%
	Community & social involvement	32	59%	22	41%

Based on Table 3.5, a graduate is classified as having achieved PEO 2 if they answered "Yes" to at least one of the three items. Out of 54 respondents, all graduates (100%) were classified as having achieved PEO 2. This is clearly illustrated in the pie chart, which shows 100% contributing to society.

The overall PEO 2 achievement rate of 100% comfortably exceeds the Key Performance Indicator (KPI) target of more than 65% for the 2021 cohort, demonstrating that the programme has successfully produced graduates who contribute to society with professional ethics and responsibilities.

Table 3.5: Percentage achievement of PEO 2

PEO 2	KPI 2021 Cohort	Analysis PEO 2	Respondent	Achievement (%)
Contributing to society with professional ethic and responsibilities	>65%	Contributing to society with professional ethic and responsibilities	54	100%
		Not involved and not contributed to society	0	0%

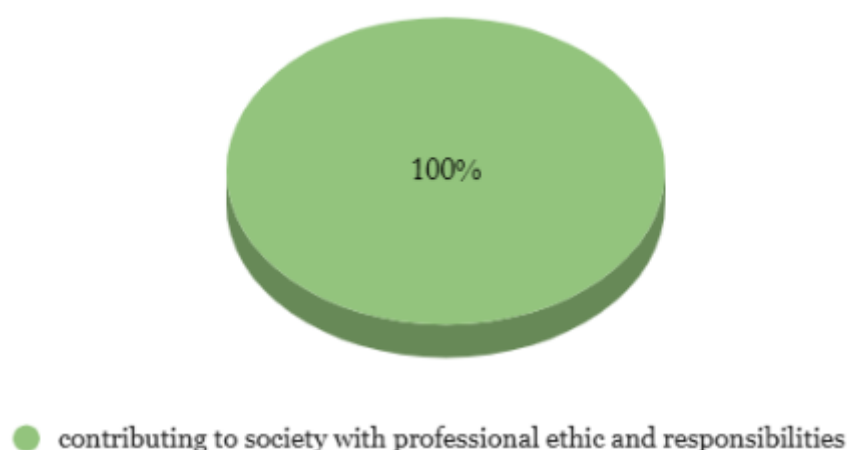


Figure 3.2: Percentage achievement of PEO 2

3.1.3 PEO 3: Engaging in enterprising activities that apply engineering knowledge and technical skills

PEO 3 represents graduates who engage in enterprising activities that apply engineering knowledge and technical skills, reflecting the programme's aspiration to nurture graduates with an entrepreneurial and innovative mindset. Table 3.6 presents the response distribution for each of the three items used to measure PEO 3. The findings are as follows:

Item 1 :Engaged in electrical/electronic engineering entrepreneurship: 19 respondents (35%) answered "Yes", while 35 respondents (65%) answered "No". This indicates that approximately one-third of graduates have ventured into entrepreneurship in the

electrical or electronic engineering field, which may reflect the relatively early career stage of the 2021 cohort.

Item 2 :Involved in R&D of products, services, or systems: 19 respondents (35%) answered "Yes", while 35 respondents (65%) answered "No". This suggests that an equal proportion of graduates are engaged in research and development activities, mirroring the entrepreneurship rate in Item 1 and indicating a consistent level of technical initiative among graduates.

Item 3 :Participated in seminars, workshops, conferences, or competitions on entrepreneurship, R&D, or innovation: 24 respondents (44%) answered "Yes", while 30 respondents (56%) answered "No". This is the highest achievement rate among the three items, indicating that participation in knowledge-sharing and competitive platforms is relatively more common than direct entrepreneurship or R&D involvement among the 2021 cohort.

Table 3.6: Percentage achievement by element in PEO 3

PEO 3	Element	Achievement			
		Yes	%	No	%
Engaging in enterprising activities that apply engineering knowledge and technical skills	Engaged in electrical/electronic engineering entrepreneurship	19	35%	35	65%
	Involved in R&D of products, services, or systems	19	35%	35	65%
	Participated in seminars, workshops, conferences, or competitions on entrepreneurship, R&D, or innovation	24	44%	30	56%

Based on Table 3.7, a graduate is classified as having achieved PEO 3 if they answered "Yes" to at least one of the three items. Out of 54 respondents, 35 graduates (65%) were classified as having achieved PEO 3, while 19 graduates (35%) were classified as not having achieved PEO 3, having answered "No" to all three items. This is clearly illustrated in the pie chart, which shows 65% involved in enterprising activities against 35% not involved.

The overall PEO 3 achievement rate of 65% exceeds the KPI target of more than 40% for the 2021 cohort, demonstrating that the programme has met its minimum benchmark in producing graduates who engage in enterprising activities that apply engineering knowledge and technical skills. However, the relatively narrow margin above the KPI threshold suggests that there is room for improvement, particularly in encouraging greater graduate involvement in entrepreneurship and R&D activities.

Table 3.7: Percentage achievement of PEO 3

PEO 3	KPI 2021 Cohort	Analysis PEO 3	Respondent	Achievement (%)
Engaging in enterprising activities that apply engineering knowledge and technical skills	>40%	Involved in Enterprising Activities, Research and Development	35	65%
		Not involved and contributed to society	19	35%

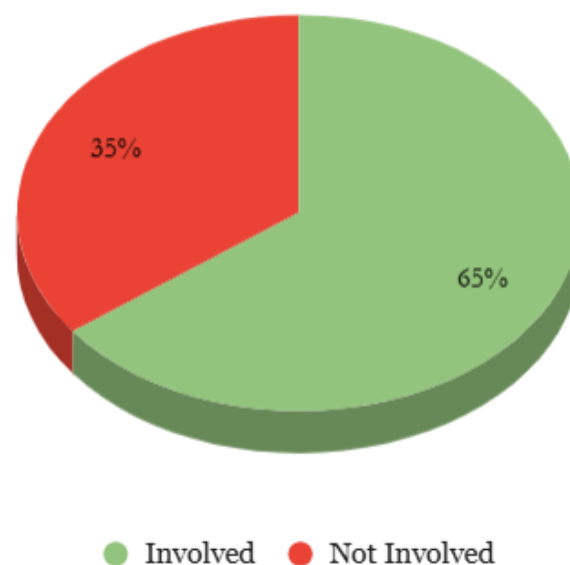


Figure 3.3: Percentage achievement of PEO 3

3.1.4 PEO 4: Engaging in activities to enhance knowledge for successful career advancement

PEO 4 represents graduates who engage in activities to enhance their knowledge for successful career advancement, reflecting the programme's commitment to nurturing a culture of lifelong learning and continuous professional development. Table 3.8 presents the response distribution for the items used to measure PEO 4. The findings are as follows:

- Item 1 :Participation in technology upskilling activities: 37 respondents (69%) answered "Yes", while 17 respondents (31%) answered "No". This indicates that more than two-thirds of graduates have actively participated in courses or activities to enhance their knowledge of new technology, reflecting a high level of engagement in lifelong learning among the 2021 cohort.
- Item 2 :Professional certification status: 17 respondents (31%) answered "Yes", while 37 respondents (69%) answered "No". This suggests that approximately one-third of graduates have attained a professional certification, indicating that while formal professional recognition is still developing among the 2021 cohort, a proportion of graduates have already taken steps toward achieving recognised competency standards in their field.

Table 3.8: Percentage achievement by element in PEO 4

PEO 4	Item/ Element	Achievement			
		Yes	%	No	%
Engaging in activities to enhance knowledge for successful career advancement	Participation in technology upskilling activities	37	69%	17	31%
	Professional certification status	17	31%	37	69%

In addition to Items 1 and 2, Table 3.9 captures the self-reported achievements of graduates through a multiple-response question. The distribution of responses is as follows: 33 respondents (61%) reported a salary increase, 14 respondents (26%) reported a promotion, 4 respondents (7%) reported establishing their own business, 17 respondents (31%) reported pursuing further education, 10 respondents (19%) selected not applicable, and 1 respondent (2%) selected other, specifying internship completed. As this is a multiple-response item, the percentages do not sum to 100% as respondents were permitted to select more than one option. Salary increase is the most frequently reported achievement at 61%, indicating that a majority of graduates have progressed in terms of remuneration since completing their studies, which reflects positively on the programme's contribution to graduates' career advancement.

Table 3.9: Percentage self-reported achievements of graduates

Achievements to date	No. of Respondent	
	Yes	Achievement %
Salary increase	33	61%
Promotion	14	26%
Own business	4	7%
Further education	17	31%
Not applicable	10	19%
Other: Internship completed	1	2%

Based on Table 3.10, a graduate is classified as having achieved PEO 4 if they answered "Yes" to at least one of Items 1 or 2. Out of 54 respondents, 40 graduates (74%) were classified as having achieved PEO 4, while 14 graduates (26%) were classified as not having achieved PEO 4, having answered "No" to both items. This is clearly illustrated in the pie chart, which shows 74% involved against 26% not involved.

The overall PEO 4 achievement rate of 74% comfortably exceeds the Key Performance Indicator (KPI) target of more than 45% for the 2021 cohort, demonstrating that the

programme has successfully produced graduates who engage in activities to enhance their knowledge for successful career advancement.

Table 3.10: Percentage achievement of PEO 4

PEO 4	KPI 2021 Cohort	Analysis PEO 4	Respondent	Achievement (%)
Engaging in activities to enhance knowledge for successful career advancement	>45%	Involvement in activities to enhance knowledge for successful career advancement.	40	74%
		Not involved	14	26%

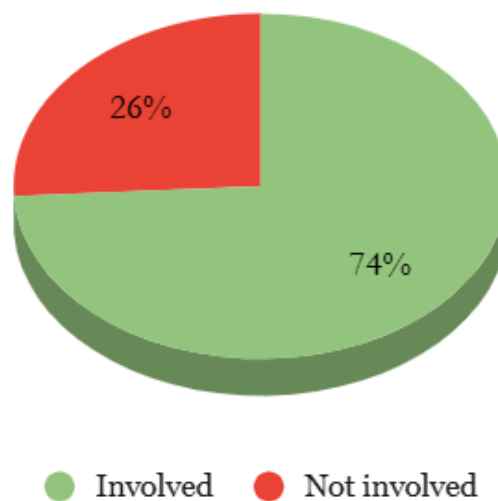


Figure 3.4: Percentage achievement of PEO 4

3.1.5 Summary

The overall analysis of the PEO achievement for the DEG programme graduates of the 2021 cohort demonstrates highly encouraging results, as presented in Table 3.11. For PEO 1, 94% of graduates are either working directly in the electrical or electronic engineering field or

applying related technical knowledge in their job scope, indicating a strong alignment between the programme curriculum and industry requirements.

For PEO 2, 100% of respondents demonstrated active involvement in ethical teamwork, professional responsibility, professional membership, or community and social activities, reflecting an exceptionally high level of professional ethics and social responsibility among graduates.

Regarding PEO 3, 65% of graduates are engaged in enterprising activities, research and development, or innovation-related events in the electrical or electronic engineering field, meeting the KPI threshold and reflecting a satisfactory level of entrepreneurial and innovative initiative among the 2021 cohort.

For PEO 4, 74% of graduates have engaged in activities to enhance their knowledge for career advancement, either through technology upskilling or attainment of professional certification, exceeding the KPI target and highlighting the programme's positive influence on the long-term professional development of its graduates.

Collectively, these findings indicate that the DEG programme effectively meets its educational objectives by producing graduates who are technically competent, professionally responsible, innovative, and committed to continuous career advancement. All four PEOs have met or exceeded their respective KPIs for the 2021 cohort, as summarised in Table 3.11, reflecting the overall effectiveness and success of the DEG programme in fulfilling its educational mission.

Table 3.11: The overall achievement for DEG programme

PEO	KPI 2021 Cohort	Analysis PEO	DEG Achievement		
			No. of Respondent	Achievement (%)	Status
PEO 1: Practicing technician in electrical engineering related field	>50%	Working in field	51	94%	Achieved
		Not working in field	3	6%	
		TOTAL	54	100%	

PEO	KPI 2021 Cohort	Analysis PEO	DEG Achievement		
			No. of Respondent	Achievement (%)	Status
PEO 2: Contributing to society with professional ethic and responsibilities	>65%	contributing to society with professional ethic and responsibilities	54	100%	Achieved
		Not involved and contributed to society	0	0%	
		TOTAL	54	100%	
PEO 3: Engaging in enterprising activities that apply engineering knowledge and technical skills	>40%	Involved in Enterprising Activities, Research and Development	35	65%	Achieved
		Not involved and did not contributed to society	19	35%	
		TOTAL	54	100%	
PEO 4: Engaging in activities to enhance knowledge for successful career advancement	>45%	Involvement in activities to enhance knowledge for successful career advancement.	40	74%	Achieved
		Not involved	14	26%	
		TOTAL	54	100%	

3.2 Analysis of Respondent Interview Protocol Method

A presentation session on the findings of the PEO achievement for the 2021 cohort was conducted online on 05 May 2026. Five stakeholders representing the DEG programme, comprising members of the IAP and alumni, attended the session. All respondents possess extensive professional experience in industries relevant to the DEG programme.

This study is part of an initiative to support the Department of Electrical Engineering (DEE) in strengthening the programme and ensuring that the field of study offered at polytechnics remains aligned with current industry demands. Accordingly, the study examined

stakeholders' views and feedback regarding the achievement of the PEOs for the DEG programme. The respondents' profiles, based on input from key stakeholders such as the IAP and alumni, are presented in Table 3.12. The feedback collected during the session has been instrumental in identifying programme strengths, areas for improvement and strategic actions to enhance the relevance and effectiveness of the DEG programme in fulfilling industry expectations.

Table 3.12: Stakeholders Respondent Profiles

Respondents	Category	Name	Position & Organization	Year of Experience
Respondent 1	IAP	Ts. Steve Anthony Lojuntin	Director, Energy Demand Management	12 years
Respondent 2	IAP	Prof. Madya Ir. Ts. Dr. Jasrul Jamani bin Jamian	Director of Research & Development, Sustainable & Innovation Engineering Sdn. Bhd.	10 years
Respondent 3	IAP	En. Hot bin Hamzah	Regional Manager Projek Lebuh raya Usahasama Bhd.	33 years
Respondent 4	IAP	En. Hatim bin Salleh	Director, AQ Energy	13 years
Respondent 5	alumni	En. Muhammad bin Jamaludin Khir	Project Coordinator Revotech Energy Sdn. Bhd.	6 years

To achieve the objectives of this study, an analysis of the PEO achievement data was carried out, complemented by interviews with the IAP and alumni of the DEG programme. These

interviews aimed to gather insights for improving the attainment of the PEO. The findings from the interviews are organised into several sections, each corresponding to a specific PEO. The PEOs were assessed through a questionnaire distributed to graduates of the 2021 cohort. This evaluation was conducted five years after graduation in accordance with the standard timeframe for PEO assessment.

All respondents participated in the PEO presentation session. All respondents generally agreed with the findings presented and acknowledged that the analysis accurately reflected the current performance of the DEG programme. However, a few respondents provided additional suggestions and recommendations to further enhance the clarity and effectiveness of the PEOs, either by sharing their views during the presentation session or through feedback submitted via the Google Form.

3.2.1 Stakeholders Feedback on PEO 1

The achievement of PEO 1 indicates that graduates have successfully acquired the necessary technical knowledge and skills and are able to apply them effectively in their respective fields of employment. Based on feedback from the IAP, the attainment of this objective is encouraging and has exceeded the target established. Nevertheless, continuous improvement of the assessment mechanism is essential to ensure that graduate achievement is measured more accurately and remains aligned with current industry requirements.

...tahniah atas pencapaian melebihi sasaran. Cuma kalau nak lebih detail, instrumen itu boleh menjurus lagi. Contohnya program DEG (Tenaga Hijau), adakah mereka betul-betul dalam bidang tenaga hijau atau elektrik secara umum? Juga, maklum balas majikan sangat penting untuk mengesahkan kompetensi mereka... (Respondent 2)

...mencadangkan survey supaya ia lebih menjurus kepada bidang yang lebih spesifik dan perlu disemak kembali rubrik / soalan yang diberikan. Dijawab oleh majikan untuk mendapat respon tentang tahap kompetensi alumni tersebut dengan lebih tepat... (Respondent 2)

Collectively, these comments indicate that although PEO 1 has exceeded the target, the assessment instrument should be refined to include programme-specific indicators and

employer validation. Such improvements would provide a more accurate evaluation of graduates' competencies in the green energy discipline.

Another stakeholder shared a similar view regarding graduates' workplace performance.

...prestasi semasa graduan Politeknik dalam industri adalah baik. Kebolehpasaran yang tinggi. Setuju peratus graduan bekerja dalam bidang, mampu mengaplikasi pengetahuan teknikal dalam pekerjaan...(Respondent 1)

This feedback indicates that graduates possess strong employability and are successfully employed in fields relevant to their academic background. Their ability to apply technical knowledge in the workplace reflects the effectiveness of the programme in preparing graduates to meet professional and industry demands.

In conclusion, PEO 1 has been successfully achieved based on the validation provided by the industry panel, which recognized the graduates' employability and their ability to apply technical knowledge and skills in professional settings. While the achievement is highly commendable, further enhancement of the assessment instrument through more specialised survey items and greater employer participation is recommended to ensure that the evaluation of graduate competencies is more accurate, objective, and aligned with industry expectations.

3.2.2 Stakeholders Feedback on PEO 2

The evaluation of PEO 2 focuses on graduates' professional development, communication skills, leadership attributes, and participation in professional bodies or organizations related to their field of expertise. Feedback from the IAP highlighted several important considerations regarding the suitability of the current assessment instrument and the relevance of the indicators used to measure the achievement of this objective. The panel generally acknowledged the high level of achievement reported for PEO 2 but recommended improvements to ensure that the assessment more accurately reflects the intended outcomes.

...contoh yang diberi pada item nombor 2 iaitu BEM, MBOT, IEEE, IEM, MySet, CIDB dan NIOSH adakah sesuai? Soalan diberi adakah menjadi ahli badan profesional atau kesatuan

yang berkaitan dengan bidang. Kalau tujuan soalan lebih kepada bidang technical seperti elektrik, bila masukkan CIDB ia akan menjadi sangat general. Maksudnya adakah itu yang dinilai pada soalan tersebut? sebab BEM, MBOT, IEEE, IEM lebih pengkhususan kepada pembelajaran yang graduan ambil...(Respondent 4)

This feedback suggests that the current instrument does not clearly distinguish professional engagement from general industry compliance requirements. The panel member noted that organizations such as BEM, MBOT, IEEE, and IEM are closely related to professional and technical development within the discipline, whereas CIDB and similar certifications may represent more general industry requirements. Therefore, greater clarity is required to ensure that the assessment accurately measures the intended aspect of professional engagement.

...mencadangkan bahawa objektif penilaian perlu jelas sama ada untuk menilai pematuhan asas (safety/basic), atau penglibatan profesional dalam bidang teknikal...(En. Hatim bin Salleh, IAP DEG)

In line with this observation, the panel recommended that the objective of the assessment be clearly defined. A distinction should be made between evaluating compliance with basic industry requirements and assessing active involvement in professional and technical development activities. Such clarification would improve the validity and reliability of the assessment outcomes.

The discussion was further expanded by another industry representative who provided insights into the practical realities surrounding graduate participation in professional bodies.

...sebenarnya memang mana-mana company bagi peluang, sama ada kita involve ataupun tak itu soalan nombor dua. Peluang saya percaya sebab saya pun ada company memang kita bagi. Kalau graduan nak join BEM, MBOT, IEE, IEM boleh, tapi belum tentu company bayar. Sebab semua-semua ni ada renew, ada CDP-nya, ada CPD-nya dan tiap-tiap tahun kena bayar. So tak ramai join, malah kalau tanya saya even engineer pun ada yang tidak sanggup jadi ahli... (Respondent 2)

This finding indicates that professional membership alone is not an appropriate indicator of lifelong professional development because participation is strongly influenced by employer

support, membership costs, and CPD requirements. However, actual participation remains limited due to factors such as membership fees, annual renewals, and continuing professional development (CPD/CDP) requirements. As a result, membership status alone may not fully reflect a graduate's commitment to professional growth.

...tidak ramai graduan/engineer yang benar-benar menyertai badan profesional dan faktor utama adalah kerana yuran keahlian tahunan dan keperluan CPD/CDP. Walaupun peluang ada, penglibatan sebenar adalah rendah. Saya setuju dengan pandangan En. Hatim bahawa CIDB hanya bersifat asas (seperti kad keperluan tapak kerja) dan tidak berkait dengan pembangunan profesional atau teknikal. Tidak sesuai dijadikan indikator utama penglibatan profesional. Oleh itu, instrument perlu lebih spesifik difokuskan kepada keahlian sebenar dan tahap penglibatan... (Respondent 2)

The panel further emphasized that professional membership indicators should focus on actual participation and engagement rather than general industry compliance requirements. The inclusion of organizations that primarily serve administrative or workplace compliance functions may not accurately represent graduates' professional development within their discipline.

In addition, concerns were raised regarding the exceptionally high attainment rate reported for PEO 2 and the need to review whether the assessment instrument truly captures the intended graduate outcomes.

...pencapaian PEO 2 99% - 100%. Perlu disemak kembali rubrik soalan. Selepas 5 tahun, apa yang harapkan sumbangan kepada masyarakat... (Respondent 2)

This observation raises concerns regarding the discriminative capability of the current assessment instrument. Achievement rates approaching 100% suggest that the instrument may not adequately differentiate graduates with varying levels of professional achievement.

Apart from professional engagement, communication skills were also identified as an area requiring continuous improvement.

...berdasarkan pengalaman membuat interview graduan dari Politeknik PD, biasanya masih malu-malu bila berkomunikasi. Beliau berpendapat penekanan softskill komunikasi perlu

ditambahbaik dengan melibatkan projek-projek yang melatih pelajar banyak berkomunikasi dengan pihak luar agar boleh memberi pengalaman dan keyakinan...(Respondent 1)

The feedback indicates that while graduates possess the required technical competencies, there is room for improvement in communication and interpersonal skills. Greater exposure to industry-based projects, stakeholder engagement activities, and external collaborations may help graduates develop confidence and professionalism in communication.

The panel also proposed a practical initiative to strengthen graduate participation in professional organizations.

...bersetuju graduan diberi peluang untuk menjadi ahli badan profesional atau kesatuan yang berkaitan dalam bidang. Namun masih terpulang kepada usaha para graduan untuk mendaftar dengan badan tersebut. Mencadangkan supaya pihak Poli PD membuat kerjasama dengan pihak badan professional seperti MBOT untuk mendaftarkan keahlian pelajar semasa pengajian... (Respondent 1)

This recommendation highlights the potential role of the institution in facilitating early professional engagement among students. Establishing collaborations with professional bodies such as MBOT could encourage greater participation and awareness of professional development pathways before graduation.

In conclusion, the achievement of PEO 2 is viewed positively by the industry panel, particularly in terms of the opportunities available for graduates to engage with professional organizations and develop their careers. However, the panel strongly recommended revisiting the assessment instrument to ensure greater clarity regarding the intended outcomes being measured. The indicators used should focus more specifically on meaningful professional involvement rather than basic industry compliance requirements. In addition, communication skills development and stronger institutional collaboration with professional bodies should be enhanced to support graduates' professional growth, lifelong learning and contributions to society and the engineering profession.

3.2.3 Stakeholders Feedback on PEO 3

The evaluation of PEO 3 focuses on graduates' ability to demonstrate entrepreneurial awareness, innovation, and involvement in activities related to R&D that contribute to the advancement of the profession and industry. Feedback from the IAP indicates that while these attributes are important, the nature of graduates' job roles and industrial environments may limit their direct involvement in entrepreneurial, innovation, and R&D-related activities. Therefore, the assessment criteria should be reviewed to better reflect the realities of industry practice and the expected contributions of graduates.

...jarang graduan terlibat atau berpeluang dalam aktiviti bidang kejuruteraan elektrik/elektronik dalam industri. Industri saya tidak terlibat dalam menganjurkan seminar, persidangan, bengkel atau pertandingan yang mempromosikan keusahawanan, penyelidikan dan pembangunan (R&D) atau inovasi dalam bidang kejuruteraan elektrik/elektronik...(Respondent 1)

The feedback indicates that opportunities for entrepreneurial involvement depend largely on the nature of graduates' employment rather than their individual capability. As many industries focus primarily on operational and production activities, graduates may not be exposed to seminars, conferences, workshops, or competitions that specifically promote entrepreneurial development, research activities, or technological innovation. Consequently, the current assessment indicators may not fully capture the actual contributions made by graduates in their workplace environments.

Respondent 2 further explained that challenges of measuring entrepreneurial involvement among graduates employed in technical positions.

...graduan tidak akan terlibat secara langsung dalam aktiviti keusahawanan melainkan jawatan sebagai sales person. Namun, rubrik boleh lihat bagaimana graduan boleh terlibat secara langsung dalam memberi impak yg positif kepada majikan (skill) @ graduan dah boleh menjalankan perniagaan sendiri selepas mendapat pengalaman di industry. Industri saya tidak terlibat/menganjurkan seminar, persidangan, bengkel atau pertandingan yang

mempromosikan keusahawanan, penyelidikan dan pembangunan (R&D) atau inovasi dalam bidang kejuruteraan elektrik/elektronik... (Respondent 2)

This statement highlights that direct involvement in entrepreneurial activities is generally uncommon among graduates working in technical roles unless their responsibilities include business development or sales-related functions. The panel suggested that the assessment rubric should be broadened to recognize other forms of entrepreneurial and innovative contributions, such as the ability of graduates to create value for their employers through technical expertise, problem-solving capabilities, process improvements, and innovation in the workplace. Furthermore, graduates who eventually establish their own businesses after gaining industry experience should also be considered as evidence of entrepreneurial achievement.

In conclusion, the industry panel acknowledged that the achievement of PEO 3 should be assessed within the context of actual industry practices and employment roles. While direct participation in entrepreneurship, R&D and innovation-related activities may be limited for many graduates, their contributions can be reflected through workplace improvements, value creation, innovation in job performance, and future entrepreneurial ventures. Therefore, the assessment instrument should be reviewed and refined to better capture these broader dimensions of entrepreneurial and innovative impact, ensuring a more realistic and meaningful evaluation of PEO 3 achievement.

3.2.4 Stakeholders Feedback on PEO 4

The evaluation of PEO 4 focuses on graduates' commitment to lifelong learning, continuous professional development, and efforts to enhance their competencies in response to evolving industry demands and technological advancements. Feedback from the IAP indicates that the current findings provide a more realistic representation of graduate achievement compared to other PEOs. However, several recommendations were made to improve the assessment instrument and strengthen graduates' awareness of professional certification and continuous skills development.

...penilaian ini dianggap lebih realistik berbanding yang lain. Tidak semua item mencapai 100%, menunjukkan data lebih munasabah. Contoh soalan terlalu umum (ya/tidak) akan mudah mendapat jawapan positif dan tidak memberi maklumat mendalam. Tidak membantu dalam penambahbaikan sebenar. Untuk mendapatkan data yang bermakna, soalan perlu lebih terperinci dan spesifik. Menjurus kepada aspek tertentu yang ingin dinilai, dapat membantu mengenal pasti ruang penambahbaikan...(Respondent 4)

The above feedback highlights that the achievement data for PEO 4 appears more realistic and credible because not all indicators recorded exceptionally high attainment rates. The panel emphasized that overly general questions, particularly those requiring simple “yes” or “no” responses, may not provide sufficient insight into graduates’ actual development efforts. More detailed and targeted questions would generate richer data and facilitate the identification of specific areas for programme improvement.

The discussion also highlighted the importance of recognizing a broad range of professional certifications that contribute to graduates’ career development.

...professional certificate tidak terhad kepada bidang teknikal tertentu sahaja. Contoh termasuk; Certified Designer (boleh endorse drawing), Kemahiran perisian seperti Excel, Sijil berkaitan AutoCAD, BIM dan lain-lain, Sijil berkaitan AI (Artificial Intelligence). Walaupun nampak umum, tetap memberi nilai kepada kerjaya... (Respondent 2)

This feedback demonstrates that lifelong learning should encompass both discipline-specific certifications and broader industry-recognised competencies, including digital and emerging technology skills. Competencies related to digital tools, design software, data management, artificial intelligence, and other emerging technologies can also enhance graduates’ employability and professional growth. Therefore, the assessment framework should acknowledge the diverse forms of certification that contribute to career advancement and lifelong learning.

In addition, the panel identified a need to examine the consistency of findings across different PEOs and to strengthen awareness among students regarding the value of professional certification.

...konsistensi data antara PEO 2 dan PEO 4 tidak selaras. PEO 2 menunjukkan pencapaian tinggi (hingga 100%), tetapi item berkaitan menunjukkan nilai lebih rendah pada PEO 4. Graduan perlu diberi lebih banyak maklumat tentang sijil profesional dan kesedaran tentang kepentingannya. Peranan pensyarah perlu mengetahui jenis professional certificate yang relevan dengan industri, memberi pendedahan kepada pelajar untuk membantu pelajar merancang hala tuju selepas graduasi. Peratusan bagi item penilaian PEO 4 ini dianggap lebih logik dan realistik. Menunjukkan instrumen lebih tepat berbanding item lain yang terlalu tinggi. Sebahagian graduan usaha ke arah peningkatkan kemahiran... (Respondent 2)

The panel noted that the achievement reported under PEO 4 appears more realistic than some of the higher attainment rates reported elsewhere, suggesting that the assessment instrument may provide a more accurate reflection of graduate behaviour. The feedback also underscores the important role of lecturers in exposing students to relevant professional certifications and helping them understand the competencies required by industry. Such guidance can assist students in planning their professional development pathways before and after graduation. Furthermore, the panel acknowledged graduates' efforts to continuously improve their competencies while recognising that such development is often influenced by workplace opportunities.

...graduan menunjukkan usaha untuk meningkatkan kemahiran atau mengikuti perkembangan teknologi baharu. Tetapi ianya banyak bergantung dengan peluang pendedahan semasa bekerja. Mencadangkan kalau boleh ada pelbagai option kursus peningkatan kemahiran yang boleh memberi nilai tambah kepada graduan. Contohnya persijilan kemahiran Solar PV yang kini diperlukan oleh pihak industri...(Respondent 1)

This feedback suggests that graduates generally demonstrate a willingness to enhance their skills and keep pace with emerging technologies. However, access to training opportunities often depends on the nature of their employment and organisational support. The panel therefore recommended providing greater access to industry-relevant upskilling programmes and certifications, such as Solar PV certification, which is increasingly valued within the industry and can enhance graduates' professional competitiveness.

In conclusion, the findings indicate that PEO 4 has been achieved at a satisfactory level, with graduates demonstrating ongoing efforts toward professional development and lifelong

learning. The Industry Advisory Panel regarded the assessment results as realistic and meaningful while recommending improvements to the assessment instrument using more detailed and specific indicators. Greater awareness of professional certifications, stronger guidance from lecturers, and increased access to industry-relevant upskilling opportunities are expected to further strengthen graduates' commitment to continuous learning and professional growth throughout their careers.

3.2.5 Summary

The stakeholder interview session provided valuable insights into the achievement of the PEOs and the effectiveness of the current PEO assessment approach. Overall, the IAP acknowledged that DEG graduates possess technical competencies, professional attributes, entrepreneurial awareness, and commitment to lifelong learning expected by the engineering industry. The findings also confirmed that the DEG programme continues to remain relevant to current industry needs and supports the development of competent graduates capable of meeting workplace expectations.

Although the overall achievement of the PEOs was viewed positively, stakeholders identified several areas for improvement to strengthen the validity and effectiveness of future PEO evaluations. The primary recommendations included refining the assessment instruments by developing more programme-specific and measurable indicators, incorporating employer feedback as part of graduate competency assessment, clarifying the definitions of professional engagement and professional certifications, and ensuring greater consistency between related PEO indicators. Stakeholders also emphasised the importance of recognising workplace contributions, innovation, and industry-relevant professional development as meaningful evidence of graduate achievement.

Overall, the stakeholder feedback provides valuable evidence for the CQI process. The recommendations obtained from the interview session will support the refinement of the PEO assessment instruments, improve the reliability of future evaluations, and ensure that the DEG programme continues to align with evolving industry expectations and professional standards.

3.3 Proposed Continuous Quality Improvement

The stakeholder feedback obtained for PEO 1 to PEO 4 provides valuable input for the CQI. The identified strengths and areas for enhancement have been reviewed by the department, and the responsible units have been identified to facilitate the implementation of appropriate improvement initiatives. The summary of stakeholder feedback and the corresponding responsible units is presented in Table 3.13.

Table 3.13: Summary of Stakeholder Feedback and Responsible Units for CQI Implementation

PEO	Stakeholder's Feedback	Stakeholder	Responsible Unit
PEO 1	The instrument is too general and does not adequately address the specific discipline or specialization of the programme. Recommendation: Review and refine the instrument items to ensure they are aligned with the programme's specific field of specialization and intended graduate competencies.	Respondent 2	UKE-BKE
	The assessment of graduate competencies should involve input from employers or industry supervisors. Recommendation: Develop and implement an Employer Survey as a supporting PEO assessment instrument to obtain industry feedback on graduate performance and competency attainment.	Respondent 2	UKE-BKE

PEO 2	The definition of professional body membership is unclear, leading to confusion between organisations such as CIDB and NIOSH, and professional bodies such as MBOT, BEM, IEM, and IEEE. Recommendation: Standardise the definitions of professional membership, professional licences, and competency certifications within the PEO measurement instrument.	Respondent 2 & 4	UKE-BKE
	The rubric and achievement levels require review, as the current achievement rates (99%–100%) are excessively high and may not realistically reflect graduate performance. Recommendation: Review and revise the rubric and measurement instrument based on the SMARTO principles to ensure more realistic, discriminative, and meaningful assessment outcomes.	Respondent 2 & 4	DEE / UKE-BKE
	The assessment instrument is overly general and does not adhere to the SMARTO principles. Recommendation: Revise and improve the assessment instrument by incorporating items that are more specific, measurable, and observable.	Respondent 2	UKE-BKE

PEO 3	As graduates are often not immediately involved in entrepreneurial ventures upon entering the workforce, the assessment should primarily evaluate their contributions to their organizations through demonstrated technical, professional, and leadership competencies. Entrepreneurial achievements may be considered at a later stage once graduates have accumulated sufficient industry experience.	Respondent 2	DEE
PEO 4	The PEO 4 instrument is too general and relies heavily on Yes/No questions. Recommendation: Include more Likert-scale items and develop more specific indicators to enable a more detailed and meaningful assessment of graduates' achievement of PEO 4.	Respondent 4	UKE-BKE
	The definition, categories, and levels of professional certifications are not clearly defined. Recommendation: Establish a standardized definition and classification framework for professional certifications that can be consistently adopted across all programmes.	Respondent 2	UKE-BKE

	There is an inconsistency between the achievement of PEO 2 and PEO 4 regarding professional engagement and certification. Recommendation: Review and refine the assessment instruments to ensure greater consistency in the definitions, indicators, and measurement methods used for evaluating these outcomes.	Respondent 2	UKE-BKE
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3.4 Determination of PEO Achievement KPI for the 2022 Cohort

The determination of the final PEO achievement target percentages for the 2022 cohort was based on the analysis of the PEO achievement results for the 2021 cohort and three key references. First, the baseline recommendations provided by the Unit Kejuruteraan Elektrik (UKE), Bahagian Kurikulum (BK), were taken into consideration. Second, the proposed target percentages were discussed and refined through consultation with the IAP during the presentation of the PEO achievement analysis. Finally, the Programme Advisory Committee (PAC) reviewed the proposed targets and approved the final PEO achievement benchmarks for the 2022 cohort.

During the consultation session, the stakeholders expressed satisfaction with the overall achievement of the DEG PEOs in the first assessment cycle. They acknowledged that all four PEOs had achieved their respective targets and agreed that the proposed performance benchmarks were appropriate for monitoring future programme performance.

Based on the review and discussion of PEO achievement trends across the five engineering programmes, all respondents agreed that the overall performance patterns were comparable. After careful consideration of the recommendations and the achievement trends of the 2021 cohort, the DEE agreed to adopt the proposed KPI targets for the 2022 cohort, as presented in Table 3.14. These targets represent a collaborative and evidence-based approach to

supporting CQI while ensuring that future PEO evaluations remain realistic, measurable, and aligned with stakeholder expectations.

Table 3.14: KPIs for PEO Achievement of the 2022 Cohort

PEO	Achievement (%)	
	Baseline UKE	Key Performance Indicator
PEO 1 Practicing Technician in Electrical Engineering Related Field	40	> 50
PEO 2 Contributing to society with professional ethics and responsibilities	40	> 65
PEO 3 Engaging in enterprising activities that apply engineering knowledge and technical skills	25	> 40
PEO 4 Engaging in activities to enhance knowledge for successful career advancement	40	> 45

4.0 DISCUSSION AND CONCLUSION

The review of PEOs for the DEG programme at Politeknik Port Dickson was conducted using two key methods: a questionnaire distributed to graduates of the 2021 cohort and structured interviews with members of the IAP and selected alumni. This analysis aimed to assess the extent to which the DEG programme has fulfilled its educational goals and how well it aligns with the evolving expectations of the engineering industry.

For PEO 1, which focuses on graduates' technical competency and employability in electrical engineering and green energy-related fields, the achievement rate for the 2021 cohort was 94%, significantly exceeding the KPI of 50%. The achievement rate of 94% demonstrates that the DEG curriculum has been effective in producing graduates who are employable and technically competent. Nevertheless, stakeholder feedback indicates that future evaluations should incorporate employer-based evidence and more programme-specific indicators to strengthen the validity of PEO assessment. These findings are summarised in Table 4.1.

Table 4.1: The summary of the analysis and the results of the interviews for PEO 1

PEO	Achievement (%)		
	KPI 2021 Cohort	Achievement 2021 Cohort	KPI 2022 Cohort
	> 50	94	> 50
PEO 1 Practicing Technician in Electrical Engineering Related Field	Interview Findings:		
	1) The instrument is too general and does not adequately address the specific discipline or specialization of the programme. 2) The assessment of graduate competencies should involve input from employers or industry supervisors.		

PEO 2 achieved an attainment rate of 100%, exceeding the KPI target of 65%. Stakeholders recognised graduates' professional engagement, ethical conduct, and participation in activities related to professional development. Nevertheless, concerns were raised regarding the clarity of the assessment indicators, particularly in distinguishing professional body membership from general industry compliance requirements. Stakeholders also suggested reviewing the rubric and assessment instrument to ensure more realistic and meaningful measurement of graduate achievement. A detailed summary of the analysis and stakeholder interview findings related to PEO 2 is presented in Table 4.2.

Table 4. 2: The summary of the analysis and the results of the interviews for PEO 2

PEO	Achievement (%)		
	KPI 2021 Cohort	Achievement 2021 Cohort	KPI 2022 Cohort
	> 65	100	> 65
PEO 2 Contributing to society with professional ethics and responsibilities	Interview Findings:		
	1) The definition of professional body membership is unclear, leading to confusion between organisations such as CIDB and NIOSH, and professional bodies such as MBOT, BEM, IEM, and IEEE. 2) The rubric and achievement levels require review, as the current achievement rates (99%–100%) are excessively high and may not realistically reflect graduate performance. 3) The assessment instrument is overly general and does not adhere to the SMARTO principles.		

The achievement rate for PEO 3 was 65%, exceeding the established KPI of 40%. Stakeholders highlighted that graduates working in technical positions may not immediately participate in entrepreneurial activities or formal research and development initiatives.

Therefore, future assessments should recognise workplace contributions, innovation, problem-solving capabilities, value creation, and leadership competencies as indicators of entrepreneurial and professional achievement. A summary of the analysis and stakeholder interview findings related to PEO 3 is presented in Table 4.3.

Table 4. 3: The summary of the analysis and the results of the interviews for PEO 3

PEO	Achievement (%)		
	KPI 2021 Cohort	Achievement 2021 Cohort	KPI 2022 Cohort
	> 40	65	> 40
PEO 3 Engaging in enterprising activities that apply engineering knowledge and technical skills	Interview Findings:		
	As graduates are often not immediately involved in entrepreneurial ventures upon entering the workforce, the assessment should primarily evaluate their contributions to their organizations through demonstrated technical, professional, and leadership competencies. Entrepreneurial achievements may be considered at a later stage once graduates have accumulated sufficient industry experience.		

PEO 4 recorded an achievement rate of 74%, exceeding the KPI target of 45%. Stakeholders regarded this result as realistic and reflective of graduates' actual commitment towards lifelong learning and professional development.

However, improvements are required to strengthen the assessment instrument, particularly in defining professional certifications, reducing reliance on binary Yes/No responses, and ensuring consistency between indicators used in PEO 2 and PEO 4. A detailed summary of the analysis and stakeholder interview findings related to PEO 4 is presented in Table 4.4.

Table 4. 4: The summary of the analysis and the results of the interviews for PEO 4

PEO	Achievement (%)		
	KPI 2021 Cohort	Achievement 2021 Cohort	KPI 2022 Cohort
	> 45	74	> 45
PEO 4 Engaging in activities to enhance knowledge for successful career advancement	Interview Findings:		
	1) The PEO 4 instrument is too general and relies heavily on Yes/No questions. 2) The definition, categories, and levels of professional certifications are not clearly defined. 3) There is an inconsistency between the achievement of PEO 2 and PEO 4 regarding professional engagement and certification.		

The assessment of the PEOs for the DEG programme at Politeknik Port Dickson demonstrates that the programme has successfully achieved its intended educational objectives, as summarized in Table 4.5. Based on the analysis of graduate survey data and stakeholder interview findings, all four PEOs recorded achievement rates that exceeded their respective KPI targets. These results indicate the effectiveness of the programme in producing graduates who are technically competent, professionally responsible, enterprising, and committed to lifelong learning and continuous professional development. Table 4.5 summarises the achievement status of all PEOs for the 2021 cohort, where each PEO exceeded the established KPI target and was therefore considered achieved.

Table 4. 5: Summary of PEO Achievement for the 2021 Cohort

PEO	KPI	Achievement	Status
PEO1	>50%	94%	Achieved
PEO2	>65%	100%	Achieved
PEO3	>40%	65%	Achieved
PEO4	>45%	74%	Achieved

The overall findings suggest that the DEG programme remains highly relevant to current industry requirements and has been effective in preparing graduates for employment, professional practice, ethical responsibilities, entrepreneurial development, and lifelong learning. The positive feedback obtained from industry stakeholders and alumni further supports the programme's ability to produce graduates who possess the competencies, attitudes, and professional attributes expected by employers in the green energy and electrical engineering sectors.

Nevertheless, stakeholders identified several opportunities for continuous improvement, including refining assessment instruments, strengthening employer participation in graduate competency evaluation, improving the measurement of professional engagement, broadening the recognition of entrepreneurial contributions within the workplace, and increasing awareness of professional certifications and upskilling opportunities. These recommendations will be incorporated into the CQI process to ensure that the programme continues to respond effectively to future industry needs and technological developments.

Overall, the assessment confirms that the DEG programme has successfully achieved all four Programme Educational Objectives and remains aligned with stakeholder expectations. The findings will serve as an important reference for future curriculum enhancement, programme review, and quality assurance activities aimed at producing graduates who are competent, adaptable, and capable of contributing to the sustainable development of the engineering profession.

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6.0 REPORT VERIFICATION

It is hoped that the PEO performance report for DEG programme Department of Electrical Engineering, Politeknik Port Dickson graduated in the 2021 cohort will contribute towards improving quality in education and training in Polytechnic Malaysia as well as strengthening the planning of polytechnic studies programmes in the future.

Prepared by;



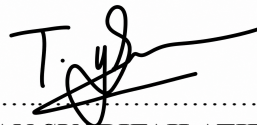
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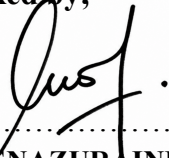
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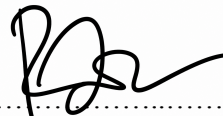
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