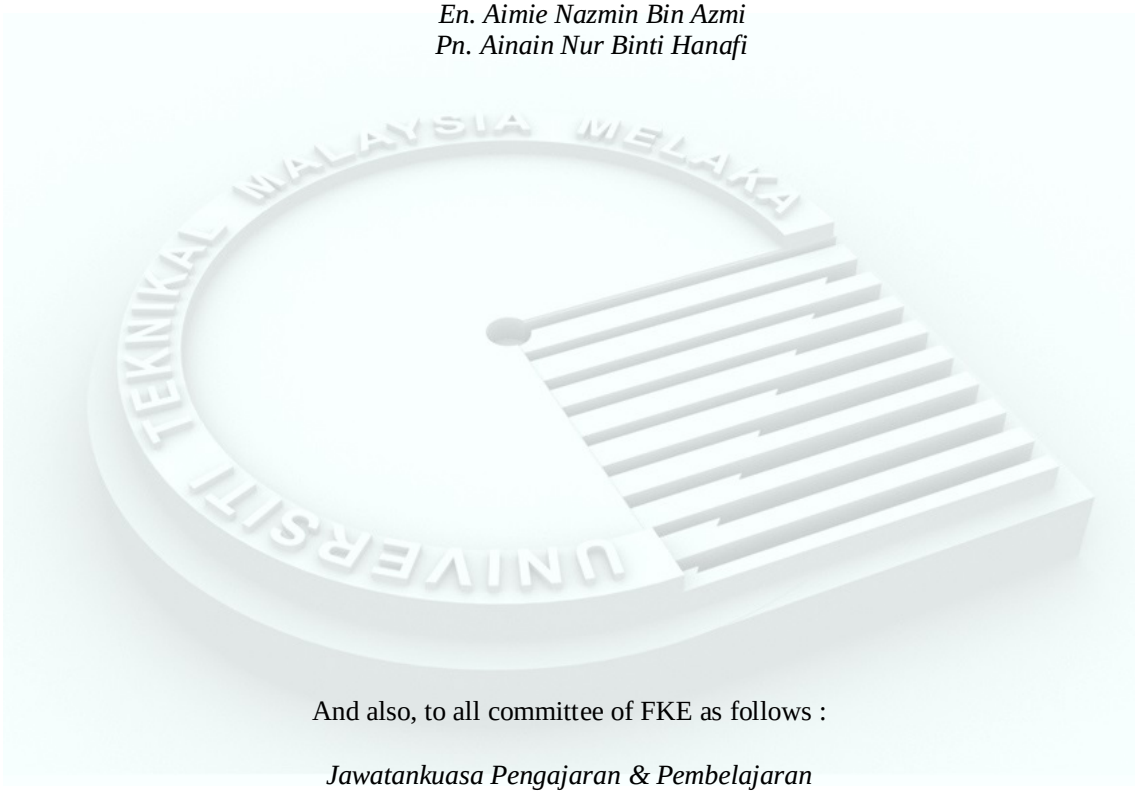
Fakulti Kejuruteraan Elektrik
Universiti Teknikal Malaysia Melaka

THE IMPLEMENTATION OF OUTCOME-BASED EDUCATION

FEBRUARY 2011

This document is prepared by:

Dr Muhammad Fahmi Bin Miskon
En. Muhamad Khairi Bin Aripin
En. Khairul Anwar Ibrahim
En. Hyreil Anuar Bin Kasdirin
En. Mohamad Riduwan Bin Md Nawawi
Cik Norhaslinda Binti Hasim
Cik Norhazilina Binti Bahari
En. Muhammad Nizam Bin Kamarudin
En. Mohd Saifuzam Bin Jamri
Cik Atikah Binti Razi
En. Hazriq
En Fairul Azhar bin Abdul Shukor
En. Aimie Nazmin Bin Azmi
Pn. Ainain Nur Binti Hanafi



And also, to all committee of FKE as follows :

Jawatankuasa Pengajaran & Pembelajaran
Jawatankuasa Seminar & Penyelidikan
Jawatankuasa Hubungan Industri & MOU/MOA
Jawatankuasa PSM & PBL

The Faculty would also like to thank all other academic, technical and support staffs in the faculty and UTeM for your contribution throughout the preparation of this document.

2 Programme Objectives

This section discusses the the Programme Education Objectives, PEO and how it relates to the vision and mission of the university. This section also describes the process to establish, assess and evaluate the PEO including the results and improvement made to the programme.

2.1 UTeM's Vision and Mission

Vision

"To Be One of the Worlds Leading Innovative and Creative Technical Universities"

Mission

"To Produce Highly Competent Professionals Through Quality and World Class Technical University Education Based On Application-Oriented Teaching, Learning and Research With Smart University-Industry Partnership In Line With National Aspirations"

Motto

"Excellence Through Competency"

Educational Goals

1. To conduct academic and professional programmes based on relevant needs of the industries.
2. To produce graduates with relevant knowledge, technical competency, soft skills, social responsibility and accountability.
3. To cultivate scientific method, critical thinking, creative and innovative problem solving and autonomy in decision making amongst graduates.
4. To foster development and innovation activities in collaboration with industries for the development of national wealth.
5. To equip graduates with leadership and teamwork skills as well as develop communication and life-long learning skills.
6. To develop technopreneurship and managerial skills amongst graduates.
7. To instill an appreciation of the arts and cultural values and awareness of healthy life styles amongst graduates.

2.2 Programme Objectives (PEO)

Programme Educational Objectives (PEO) describe the expected accomplishments of graduates during the first several years following graduation from the programme (ABET Criteria, November 2003). The determination of the PEO is line with Vision, Mission and Objectives of the university. In 2005, the PEO was introduced by the faculty then later the PEO is reviewed in 2008. The review was done after a meeting with stakeholders in the year mentioned. The Programme Educational Objectives (PEO) are:

1. To produce engineers who are able to apply engineering knowledge in their professional careers.
2. To produce engineers who are creative and innovative in adapting themselves into the global working environment.
3. To produce engineers who practice high standards of ethical conduct and societal responsibilities.
4. To produce engineers who are capable of developing their professional career through both practical experience and life long learning.
5. To produce engineers who have strong technical competency in the field of Control, Instrumentation and Automation.

The PEO are published in the Yearly Faculty Academic Guidebook and faculty's website. Its also have been printed in the posters and faculty's pamphlets. (Refer to Supporting Document – digital format Folder E)

The PEO of the Faculty of Electrical Engineering UTeM has been synchronized with the University mission.

Table 2.1 shows how the Programme Educational Objectives is related to UTeM vision and mission.

Table 2.1: FKE PEO versus UTeM Vision and Mission

	PEO1	PEO2	PEO3	PEO4	PEO5
Vision of UTeM		√			
Mission of UTeM	√		√	√	√

2.3 Process of Establishment and Review of PEO

The overall process of establishment and review of PEO is based on the Quality Management System implementation, which is described in Chapter 8 of this report. In summary, the overall process of establishment of PEO is described as follows:

2.3.1 Plan

The first version of PEO for FKE are established based on inputs from all stakeholders via series of meetings, discussions, benchmarking activities, internal and external inputs, together with the academic staff. The PEO established was endorsed and from there, the processes of admission, curriculum, facilities and education framework was prepared and established. After all the planning has been put in place, then, the engineering education program was implemented based on the frameworks established, in order to support the stipulated PEO. The implementation includes all teaching and learning activities and educational support.

2.3.2 Do

During implementation of engineering educational program, the assessment activities of the program are carried out, which includes teaching assessment and ability assessment. The ability assessment process is actually the process of checking the PEO where the alumni and industry survey is carried out. This survey statistics shall reflect the achievements of PEO and in consequent, an immediate action plan for improvement is established.

2.3.3 Check

Based on the results above, the data/information is then used in the next process, which is called Consulation for Improvement of Educational Program, focusing on the relationships and implication to the currently established PEO. This process is also known as reviewing the PEO. This process is executed by a series of workshops, seminars, technical discussions with EAC personnels, External Examiners, Adjunct Professors, Visiting Professors and Industrial Advisory Panels (IAP); together with the academic staff of FKE.

2.3.4 Action

After several discussion process of reviewing PEO, the next process is in recognizing the new and improved framework or action plans. In this phase of the cycle, series of meetings, discussions are carried out to implement the suggested improvement strategies derived from the PEO review activities. Then, once approved, the new and improved version of PEO are then officially published to replace the current PEOs.

Apart from the formal review process above, the faculty and as well as other relevant departments in UTeM, has also continuously conducted several meetings, workshops and seminars related to Outcome Based Education (OBE), as a platform for discussions, review and sharing of all relevant elemens of OBE, including PEO. The following Table 2.2 lists out the activities between 2009 until 2010.

6. To produce graduates who are capable to undertake life long learning.	- The PEO 6 is removed

Materials related to the workshop activities such as paperwork, list of stakeholders, report and comment from the stakeholders are attached in the Supporting Materials Documents- digital format (details will also be provided during accreditation visits).

2.4 Programme Educational Objectives Assessment

The process of measuring PEO achievements is implemented as part of the QMS/CQI process, explained in Chapter 8 of this report. The overall process of the PEO assessment of the faculty is also implemented using Continual Quality Improvement (CQI) with the following methods (Refer to Chapter 8 for more detail on Quality Management System):

1. Curriculum was designed in accordance to industrial needs and advice from Curriculum Advisory Panel (refer to Appendix 2: Pekeliling Pentadbiran Bilangan 25/2010.
2. Comment from External Examiner and Visiting Professors (refer to Section 8 page 95).
3. Surveys from various stakeholders (refer to Section 2 Page 17).
4. Implementation of soft-skills set by The Ministry of Higher Education (refer Section 3 Page 30).

The summary of methodology (tools and performance indicator) used to perform this assessment is described in Table 2.4.

Table 2.4: Summary of Methodology Used to Assess the PEO Achievement

Program Educational Objective (PEO)	Assessment Tools	Indicators	Measurable Outcome Analysis
PEO1: Engineers who are able to apply engineering knowledge in their professional careers	Employer survey	• ≥ 60% of the graduate are employed according to their electrical engineering qualification	• Employability of graduates in electrical engineering sectors (ES)
	Alumni survey	• ≥ 60% of the graduate work in electrical engineering field	• Nature of work require the knowledge obtained in undergraduate studies (AS)
PEO2: Engineers who are creative and innovative in adapting themselves into the global working environment	Employer survey	• 30% of the graduates work in multinational industries	• Working in multinational industries (ES)
	Employer survey	• 30% of the graduate works with international standard	• Working with companies that comply with International

		compliant companies	Standards (ES)
	Employer survey	• 30% of the company require creative and innovative criteria	• Creative and innovative to fulfill job specification (ES) •
	Alumni survey	• 5% of alumni are involved in new product / innovation	• Involvement in new product / innovation (AS)
PEO3: Engineers who practice high standards of ethical conduct and societal responsibilities.	Employer survey	• less than 1% of graduates are charged in disciplinary cases	• Charged in any disciplinary cases (ES)
	Alumnai survey	• 50% of the graduates are registered as a members	• Register with professional bodies (AS)
		• 5% of the graduates join voluntary bodies / NGO	• Involve with voluntary bodies/Non Profit Organization (AS)
		• 80% of the graduates have societal responsible	• Willing to help people (AS)
PO4: Engineers who are capable of developing their professional career through both practical experience and lifelong learning.	Employer survey	• 80% of the graduate shows interest	• Show interest in attending professional courses / training (ES)
	Alumnai survey	• 20% of alumni have intention to further studies	• Pursuing further studies (AS)
		• 50% of the graduate gone through training	• Participated or engaged in professional development activities (AS)
PEO5: Engineers who have strong technical competency in the field of Industrial Power/ Control, Instrumentation & Automation/ Power Electronics & Drives or Mechatronics Engineering.	Employer survey	• 60% of the employer satisfied with the graduates competency	• Employer satisfactory in technical competency (ES)
	Alumnai survey	• 10% of alumni get working competency certificate	• Hold any competencies certificate

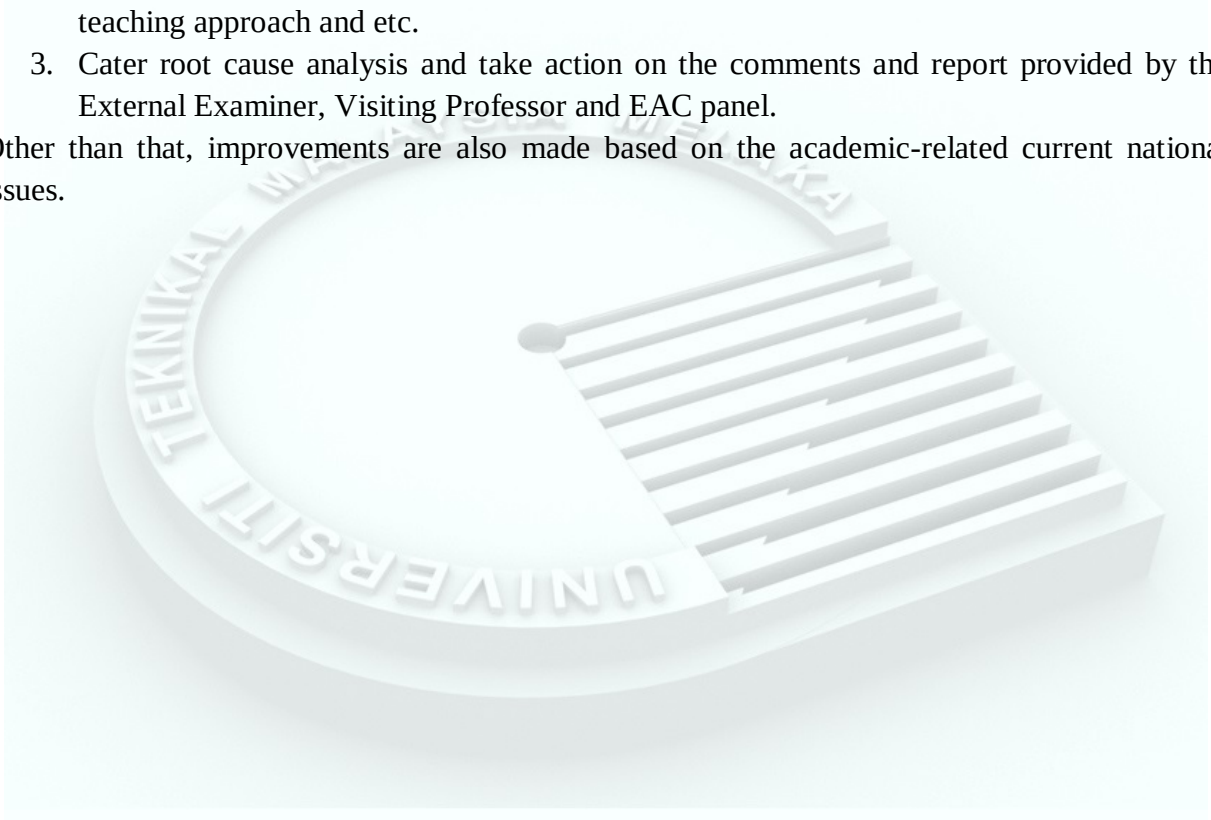
		• 10% of alumni get promotion or awards	• Promotion or awards

2.5 Improving the Effectiveness of the Programme based on the Evaluation Results

In order to improve the effectiveness of the programme, the results obtained by this evaluation are used by:

1. Organizing the yearly academic meeting to ensure the achievements of PO are consistent with the targeted PEO.
2. Taking appropriate actions based on the data collected from the surveys, in terms of the root cause analysis, reviewing the PO and PEO, reviewing the curriculum, syllabus, teaching approach and etc.
3. Cater root cause analysis and take action on the comments and report provided by the External Examiner, Visiting Professor and EAC panel.

Other than that, improvements are also made based on the academic-related current national issues.



3 Programme Outcomes

3.1 Programme Outcomes (PO)

Generally, Programme Outcomes are statements that describe what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behavior that students have acquired through the programme. As described earlier in the Programme Educational Objectives, the Programme Outcomes had some minor amendments after the meeting with stakeholders.

The students of an engineering programme are expected to attain the following:

NO	PROGRAMME OUTCOMES (PO)
1	**An ability to apply fundamental knowledge of mathematics, sciences, electrical and/or mechatronics engineering. (K,A)**
2	**An ability to design a system, component, or process to meet desired needs within certain specifications. (K,S,A)**
3	**An ability to design and conduct experiments, as well as to analyze and interpret data for practice and applications. (K,S)**
4	**An ability to identify, formulates, and solves engineering problems. (K)**
5	**An ability to use engineering tools necessary for engineering practices. (S)**
6	**An ability to practice professional and ethical conduct. (K,A)**
7	**An ability to communicate effectively, not only within the engineering society but also within the community at large. (A)**
8	**An ability to function in a team effectively. (A)**
9	**An ability to undertake life long learning. (A)**
10	**An ability to identify fundamental entrepreneurship skills as applied in the engineering profession. (K)**
11	**An ability to have knowledge of contemporary issues. (K)**

*Note that K – Knowledge, S – Skill, A – Attitude

The POs are published in the Yearly Faculty Academic Guidebook and faculty's website. Its also have been printed in the posters and faculty's pamphlets.

3.2 The relationship between Programme Outcomes and Programme Educational Objectives

The Programme Outcomes (PO) in relation to the Programme Educational Objectives (PEO) of the faculty is compared in the Table 3.1 below.

Table 3.1: The Matrix of PO versus PEO

No	Programme Outcomes	Programme Educational Outcomes				
		1	**2**	**3**	**4**	**5**
1	Ability to apply fundamental knowledge of mathematics, sciences, electrical and/or mechatronics engineering. (K,A)	3	2	1	3	3
2	Ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. (K,S,A)	3	1	0	3	3
3	Ability to design and conduct experiments, as well as to analyze and interpret data for practice and applications. (K,S)	3	2	3	3	3
4	Ability to identify, formulate and solve engineering problems. (K)	3	2	0	2	3
5	Ability to use engineering tools necessary for engineering practices. (S)	3	2	0	3	3
6	Ability to practice professional and ethical conduct. (K,A)	1	1	3	1	2
7	Ability to communicate effectively, not only within the engineering society but also within the community at large. (A)	1	3	2	3	2
8	Ability to function in a team effectively with the capacity to be a leader or manager. (A)	0	2	3	2	1
9	Ability to undertake lifelong learning. (A)	2	1	0	3	2
10	Ability to identify fundamental entrepreneurship skills as applied in the engineering profession. (K)	1	3	2	1	1
11	Ability to have knowledge of contemporary issues. (K)	0	3	3	2	1

Note:		
	0	No Emphasis
	1	Related to PO
	2	Partial fulfillment of PO
	3	Total fulfillment of PO
	K	Knowledge
	S	Skill
	A	Attitude

3.3 Establishment and Review the Programme Outcomes

This section describes the process of establishing, assessing and evaluating the achievement of the programme outcome. The process used to establish PO is already explained in Section 2.3. Table 3.2 illustrates the comparison between the previous PO with the amendments PO and PEO.

Table 3.2: The Comparison Between the Old and New Programme Outcomes (PO)

	PROGRAMME OUTCOMES (PO)		
No.	The Previous PO	**The Amendment of PO**	**Changes**
1	Ability to apply fundamental knowledge of mathematics,	**Ability to apply fundamental knowledge of mathematics,**	**No Changes**

	sciences, electrical and/or mechatronics engineering. (K,A)	**sciences, electrical and/or mechatronics engineering. (K,A)**	
2	Ability to design a system, component, or process to meet desired needs within certain specifications. (K,S,A)	**Ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. (K,S,A)**	**Change to add "realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. (K,S,A)"**
3	Ability to design and conduct experiments, as well as to analyze and interpret data for practice and applications. (K,S)	**Ability to design and conduct experiments, as well as to analyze and interpret data for practice and applications. (K,S)**	**No Changes**
4	Ability to identify, formulates, and solves engineering problems. (K)	**Ability to identify, formulate and solve engineering problems. (K)**	**No Changes**
5	Ability to use engineering tools necessary for engineering practices. (S)	**Ability to use engineering tools necessary for engineering practices. (S)**	**No Changes**
6	Ability to practice professional and ethical conduct. (K,A)	**Ability to practice professional and ethical conduct. (K,A)**	**No Changes**
7	Ability to communicate effectively, not only within the engineering society but also within the community at large. (A)	**Ability to communicate effectively, not only within the engineering society but also within the community at large. (A)**	**No Changes**
8	Ability to function in a team effectively. (A)	**Ability to function in a team effectively with the capacity to be a leader or manager. (A)**	**Change to add with the capacity to be a leader or manager. (A)**
9	Ability to undertake life long learning. (A)	**Ability to undertake lifelong learning. (A)**	**No Changes**
10	Ability to identify fundamental entrepreneurship skills as applied in the engineering profession. (K)	**Ability to identify fundamental entrepreneurship skills as applied in the engineering profession. (K)**	**No Changes**
11	Ability to have knowledge of contemporary issues. (K)	**Ability to have knowledge of contemporary issues. (K)**	**No Changes**

All the details and materials related to the workshop activities such as paperwork, list of stakeholders, report and comment from the stakeholders shall be available during the accreditation visit.

3.4 Description on the Data Gathered and Explanation of the Result of the Assessment.

The data gathered is from two methods of assessments; the direct assessment and indirect assessment (both could be either qualitative or quantitative assessment). The direct assessments are referring to the total assessments of the subjects taken while indirect assessments are referring to the surveys conducted on the students, employers and as well as

stakeholders. The summary of methodology used to perform the PO assessment is described in Table 3.4

Table 3.4: The summary of Methodology Used to Assess the PEO Achievement

Program Outcome (PO)	Measurement Tools		When Data Collection / Interpret / Analyze	Indicators of Achievement
PO1: ability to apply fundamental knowledge of mathematics, sciences, electrical and/or mechatronics engineering. (K,A)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment (for selected subjects)
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the FYP assessment
		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO2: ability to design a system, component, or process to meet desired needs within certain specifications. (K,S,A)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment

		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO3: ability to design and conduct experiments, as well as to analyze and interpret data for practice and applications. (K,S)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey

PO4: ability to identify, formulate, and solve engineering problems. (K)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO5: ability to use engineering tools necessary for engineering practices. (S)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey

		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO6: ability to practice professionnal and ethical conduct. (K,A)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO7: ability to communicate effectively, not only within the engineering society but also within the community at large. (A)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment

	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO8: ability to function in a team effectively. (A)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
PO9: ability to undertake lifelong learning. (A)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment

		• Industrial Training Assessment Criteria	• During Industrial Training Visit	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
P10: ability to identify fundamental entre-preneurship skills as applied in the engineering profession. (K)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment
		• Final Year Project Assessment Criteria	• FYP Assessment	• ≥ 60% of the students get above 50% of allocated marks in the assessment
	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey
P11: ability to have knowledge of contemporary issues. (K)	**Direct**	• Teaching Assessment.	• End of every semester	• ≥ 60% of the students get above 50% of allocated marks in the assessment

	Indirect	• Base on the questions in Student Exit Survey - Filled up by Final year Student	• Graduation day	• ≥ 60% of the student rated above 2 (50%) from the Exit Survey
		• Base on the questions in Industrial Training Survey – Filled up by Industrial Supervisor	• During Industrial Training Visit	• ≥ 60% of the student rated above 2 (50%) from the Industrial Training Survey

There are several type of assessment activity hve been done in 2010 to assess the achievement of PO among students, graduates, alumni as well as stakeholders. The list of assessments and its tentative (with respect to student's year) is shown in Table 3.5.

Table 3.5: Assessment Activities Planning

		Year (During Study)				Year (After Graduated)			
Type	**Assesment**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
#	Entry Survey	√							
#	Teaching Assessment	√	√	√	√				
*	External Examiner	Conducted once in every two years							
*	Exit Survey				√				
#	Industrial Training Survey			√					
#	PSM Evaluation				√				
#*	Employer Survey								√
#*	Alumni Survey								√
#*	Benchmarking		√		√		√		√
Note: **Feedback during 1. Faculty's PEO and PO review panel meeting and 2. PEO and PO Review Workshop**									
# : Quantitative Assessment									
*** : Qualitative Assessment**									

The Faculty of Electrical Engineering has introduced the Teaching Assessment starting from Semester 2008/2009 for the direct assessment. (Refer to Appendix 2: The sample of Teaching Plan and Teaching Assessment). This document completes the Teaching Plan to measure the achievement of the Learning Outcomes (LO) of the course, as well as the Programme Outcomes (PO) and indirectly to the Programme Educational Objectives (PEO). It provides systematic assessment documentation for evaluation. All necessary action taken by the lecturer can be documented and monitored by the Head of Department.

Based on the compilation of the Teaching Assessment, yearly evaluation is conducted for every cohorts and programs/courses. In total, for one cohort of students their Teaching Assessment is evaluated four times.

In addition, FKE is also still continuing to improve its CQI process for teaching assessment from time to time, including in developing a new and improvised system (using automation of computer software) and standardized guideline with embedded CQI implementation. Furthermore, corrective actions are done based on the feedback made by the external examiner, visiting professor and EAC panel after the accreditation visit.

4 Quality Management Systems

4.1 Quality Management System

This section describes the organizational structure, procedures, processes and resources to implement quality management in Faculty of Electrical Engineering (FKE), UTeM. FKE's Quality Management System (QMS) consists of Quality Assurance and Quality Improvement activities (CQI). Quality Assurance (QA) activities include a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process. Quality Improvement (QI) is a formal approach to the analysis of performance and systematic efforts to improve it.

The QMS in UTeM including FKE adheres to ISO 9001:2008 standards. ISO 9001:2008 specifies requirements for a quality management system where an organization needs to demonstrate its ability to consistently provide product that meets customer and applicable regulatory requirements, and aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable regulatory requirements. All requirements of this International Standard are generic and are intended to be applicable to all organizations, regardless of type, size and product provided.

4.2 Continual Quality Improvement System

FKE has developed a CQI system based on PDCA method which involved a continual cycle of Plan, Do, Check and Action. Figure 8.1 illustrates FKE's continual quality improvement system. The illustration provide information of the component, process, activities, people involve as well as the tools use for performing PDCA method. The following subsections describe how the PDCA cycle is implemented in FKE.

4.2.1 Plan

A PDCA cycle starts with the identification of a new problem or an introduction to a new define target. In the planning stage, the problem is analyzed and its cause is identified. Then countermeasures to solve the problems will be proposed. In general, the countermeasures involve the improvements of any of the 5 main areas which are:

1. Educational framework (i.e. the curriculum)
2. Educational method
3. Student
4. Staff
5. Facilities

These are the components which support or/and act as the main input to the Engineering Educational program.

4.2.2 Do

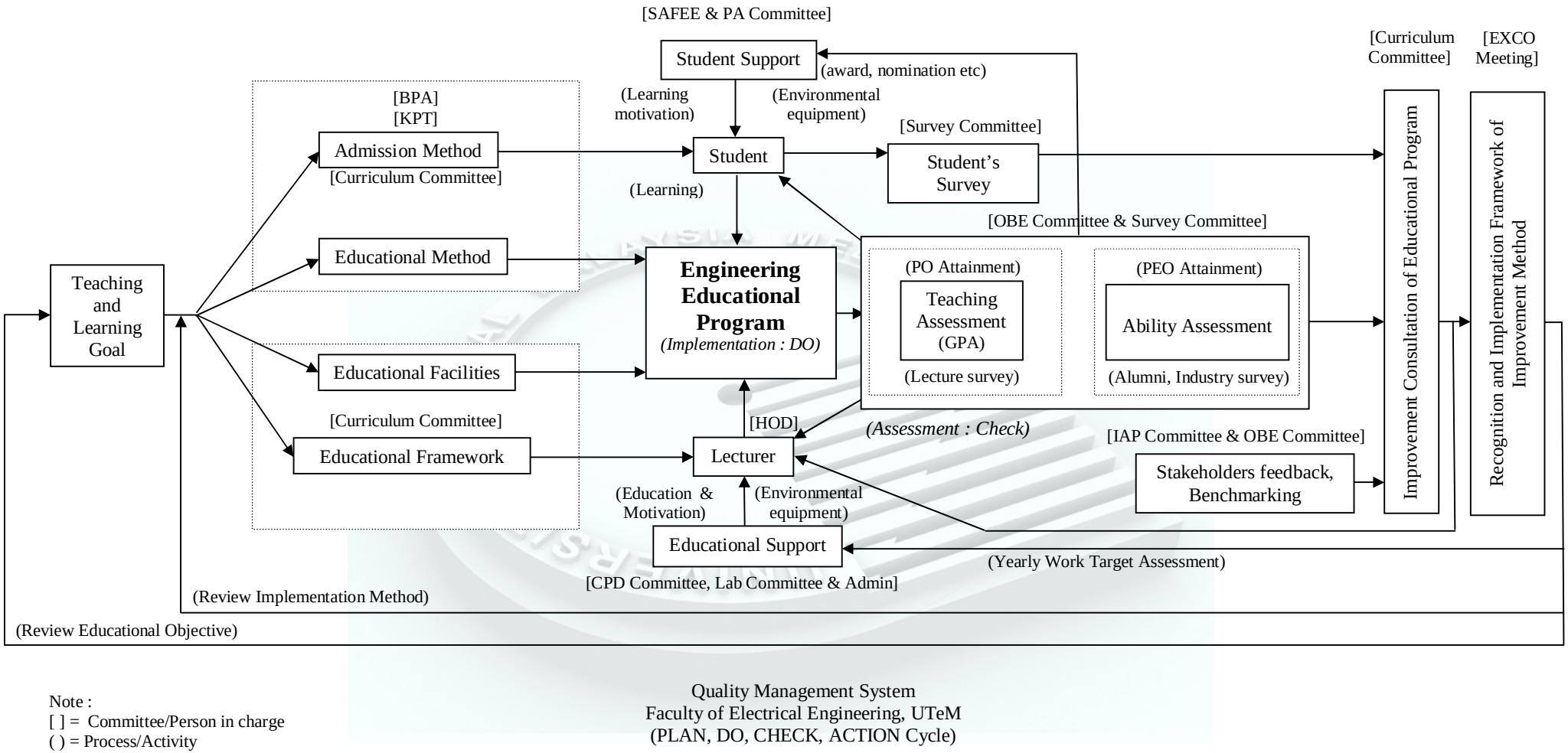
The proposed countermeasures will be implemented when conducting the educational program.

4.2.3 Check

The student's program outcome and objectives are measured in order to know the effectiveness of the proposed countermeasure in solving the problem. The measurements of PO and PEO are conducted directly using teaching assessment and indirectly using surveys. Sample of the teaching assessment and surveys will be provided upon request during the visit.

4.2.4 Action

The conclusion from the analysis of results conducted during the Check phase will be use to make the next decision. If the results show that the countermeasure do solve the problem, FKE management make it a new standard and the cycle is considered completed.
Otherwise, the PDCA cycle will be repeated.



Note :
[ ] = Committee/Person in charge
( ) = Process/Activity

Quality Management System
Faculty of Electrical Engineering, UTeM
(PLAN, DO, CHECK, ACTION Cycle)

Figure 8.1: The PDCA Cycle for FKE Engineering Educational Programme

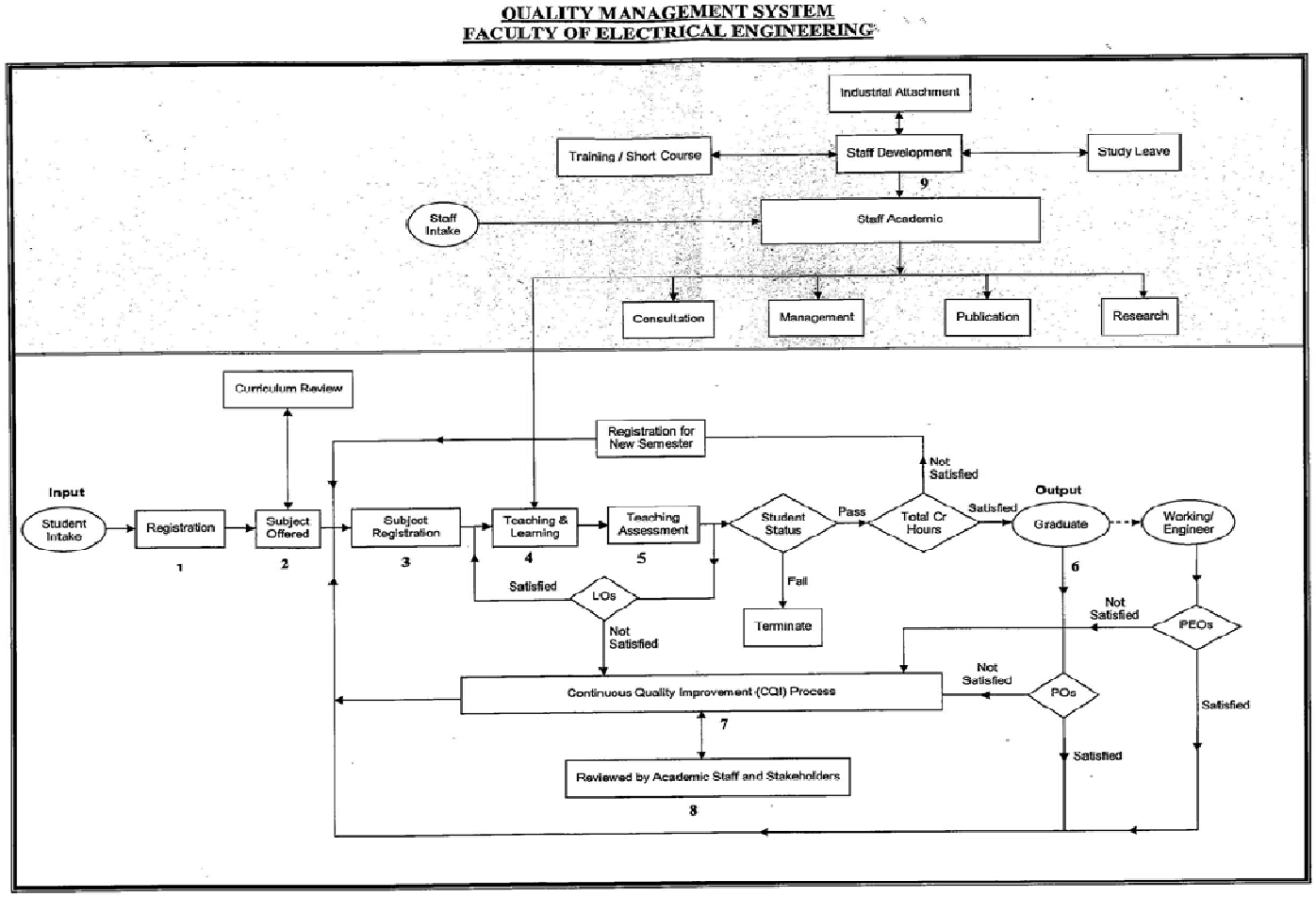


Figure 4.2: Quality Management System of the Faculty of Electrical Engineering