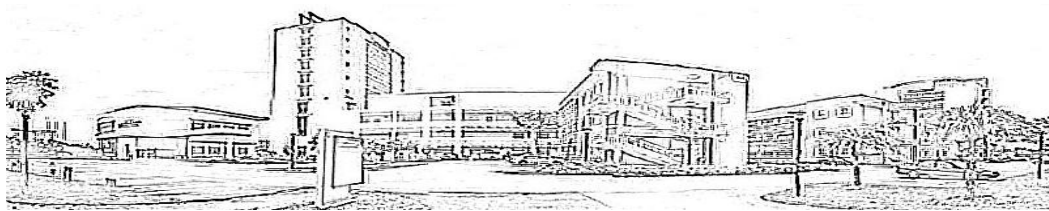




# **OUTCOME-BASED EDUCATION IN FKAAB OBE REPORT 2020**



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# 1 INTRODUCTION

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## 1.1 Outcome-Based Education (OBE) in FKAAB

This report presents the activities and the direct and indirect measurements on the practices of Outcome-based Education (OBE) in the Faculty of Civil Engineering and Built Environment (FKAAB), both quantitative and qualitative to exhibit the attainments of Programme Educational Objectives (PEO), Programme Learning Outcomes (PLO) and Course Learning Outcomes (CLO) for the programme of Bachelor in Civil Engineering with Honours (BFF) programme for the year 2020.

Throughout the year, continuous activities related to OBE were done in FKAAB to ensure the success of OBE implementation within the whole faculty. These activities, not including teaching and learning activities for the years 2020 are summarised in Table 1-1.

The BFF programme is an undergraduate 4 year programme that carries a total of 136 credits, and of which 94 credits are for Core Engineering courses. This programme is developed with a framework to establish 4 Programmed Educational Objectives (PEO) as shown in Table 1-2. The mapping relationship of PEO to Programme Learning Outcomes (PLO) is also presented in the same table.

BFF programme in FKAAB adheres to 13 PLO, of which 12 PLO has direct reference to the Engineering Accreditation Council (EAC) Manual 2012, and 1 PLO on entrepreneurial skills referenced to the Malaysian Qualifications Framework 2011. Table 1-3 elaborates all the 13 PLO in detail relating each PLO to one Primary Domain and linking the FKAAB PLO numbering to the PLO numbering in the EAC Manual 2017. Table 1-4 shows the knowledge profile (WK) that encompass the PLO in the curriculum.

Table 1- 1. Summary of FKAAB OBE activities year 2020

No	Activity/ Programme	Date	Objective	Outcome
1.	Benchmarking for OBE and Accreditation to UTM	10 / 2 / 2020	Benchmark to established Universities in order to improve the practices of OBE	New insight on OBE implementation.
2.	OBE meeting	25/02/2020	Form of TEAM OBE for 2020 and distribution task force.	All OBE committee took action on that particular matter.
3.	Activity of sending tracer study to alumni and employer (Google form)	3 to 9/2020	To collect data for tracer study.	Tracer study data collected.
4.	SAR Report Part D	3 to 11 / 2020	Prepare all the data and analysis for Part D of SAR Report.	All the data was prepared and gave to SAR committee.
5.	Fundamental Civil Engineering Exam (FCEE)	13 / 6 / 2020	PLO direct measurement on Final Year Students in IDP	Evaluation of PLO achievement for direct measurement on Final Year Students.
6.	Complex Engineering Problem (CPS) Workshop	1 – 2 / 9 / 2020	Workshop to explain the implementation of CEP in selected courses.	The new rubric for project is produced for selected courses.
7.	Activities of Exit survey by Graduates.	10/2020	To collect data for exit survey.	Exit survey data collected
8.	CLO-PLO analysis for Session 2019 / 2020	10/2020	Analysis of PLO	Evaluation of PLO achievement from continuous direct measurement of the student's results for Semester 1 and 2, Session 2019/2020.
9.	OBE meeting	13/09/2020	Distribute task for OBE Report analysis 2020	All OBE committee took action on that particular matter.

10.	OBE workshop	11/2020	Preparation of OBE annual report for BFF Program, FKAAB	All OBE committee took action on that particular matter
11.	Stakeholder symposium	6 / 12 / 2020	Collect input from all stakeholders to improve the practices of OBE	New insight on OBE implementation.
12.	External Examiner (EE) Visit	23 / 12 / 2020	Collect input from EE to improve the practices of OBE	New insight on OBE implementation.
13.	Fundamental Civil Engineering Exam (FCEE)	19 / 12 / 2020	PLO direct measurement on Final Year Students in IDP	Evaluation of PLO achievement for direct measurement on Final Year Students.

Table 1- 2. Programme Educational Objectives (PEO) of Bachelor of Civil Engineering with Honours

PEO	Educational Objectives of BFF Programme are to produce civil engineers who are	Mapping of PEO to PLO
1	Knowledgeable and technically competent in civil engineering discipline in-line with the industry requirement	PLO 1, 2, 10
2	Effective in communication and demonstrate good leadership quality in an organization	PLO 3, 5, 9, 13
3	Capable to solve civil engineering problems innovatively, creatively and ethically through sustainable approach	PLO 4, 8, 11, 12
4	Able to demonstrate entrepreneurship skills and recognize the need of lifelong learning for successful career advancement	PLO 6, 7

Table 1- 3. Programme Learning Outcomes (PLO) of Bachelor of Civil Engineering with Honours

PLO	Key Outcome	Description of Learning Outcome
1	Engineering <u>Knowledge</u> (K)	Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation as specified in WK1 to WK4 respectively to the solution of complex civil engineering problems.  Primary Domain: COGNITIVE PLO 1 in EAC Manual
2	<u>Practical / Technical Skills/ Modern Tool Usage</u> (PS)	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6).  Primary Domain: PSYCHOMOTOR PLO 5 in EAC Manual
3	<u>Communication Skills</u> (CS)	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.  Primary Domain: PSYCHOMOTOR PLO 10 in EAC Manual

- |   |  |   |
|---|--|---|
| 4 | <u>C</u> ritical <u>T</u> hinking<br>and <u>P</u> roblem<br><u>S</u> olving /<br><u>I</u> nvestigation<br>(CTPS) | <p>Conduct investigation of complex engineering problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.</p> <p>Primary Domain: COGNITIVE</p> <p>PLO 4 in EAC Manual</p> |
| 5 | <u>I</u> ndividual and<br><u>T</u> eam <u>W</u> ork (TW)   | <p>Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.</p> <p>Primary Domain: AFFECTIVE</p> <p>PLO 9 in EAC Manual</p>  |
| 6 | <u>L</u> ife Long <u>L</u> earning<br>(LL)   | <p>Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p> <p>Primary Domain: AFFECTIVE</p> <p>PLO 12 in EAC Manual</p>   |
| 7 | <u>E</u> ntrepreneurship<br><u>S</u> kills (ES)  | <p>Self-motivate and enhance entrepreneurship skills for career development.</p> <p>Primary Domain: PSYCHOMOTOR</p> <p>In MQF</p>   |
| 8 | <u>E</u> thics and<br><u>P</u> rofessionalism<br>Values (ET)   | <p>Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7).</p> <p>Primary Domain: AFFECTIVE</p> <p>PLO 8 in EAC Manual</p>   |
| 9 | <u>L</u> eadership <u>S</u> kills /<br><u>P</u> roject<br><u>M</u> anagement and<br><u>F</u> inance (LS)         | <p>Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.</p> <p>Primary Domain: PSYCHOMOTOR</p> <p>PLO 11 in EAC Manual</p>          |

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|----|--|--|
| 10 | <u>Design / Development of Solutions (DDS)</u> | <p>Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (WK5).</p> <p>Primary Domain: COGNITIVE</p> <p>PLO 3 in EAC Manual</p>      |
| 11 | <u>Problem Analysis (PA)</u>                   | <p>Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4).</p> <p>Primary Domain: COGNITIVE</p> <p>PLO 2 in EAC Manual</p>                           |
| 12 | <u>Environment and Sustainability (ESus)</u>   | <p>Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts.</p> <p>Primary Domain: AFFECTIVE</p> <p>PLO 7 in EAC Manual</p>   |
| 13 | <u>The Engineer and Society (ESoc)</u>         | <p>Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (WK7).</p> <p>Primary Domain: AFFECTIVE</p> <p>PLO 6 in EAC Manual</p> |
-

Table 1- 4. Knowledge profile (WK) attributes in the Programme Learning Outcomes (PLO) of Bachelor of Civil Engineering with Honours

Knowledge Profile	Knowledge Profile Description
WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline.
WK2	Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge that supports engineering design in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.
WK8	Engagement with selected knowledge in the research literature of the discipline.

The relationship and distribution of courses under BFF programme to PLO is presented in Fig. 1-1 to Fig. 1-4. The dominant level in each taxonomy domain is C4, P4 and A3, respectively, for Cognitive, Psychomotor and Affective domains. This is consistent with the undergraduate programme level of expectancy.

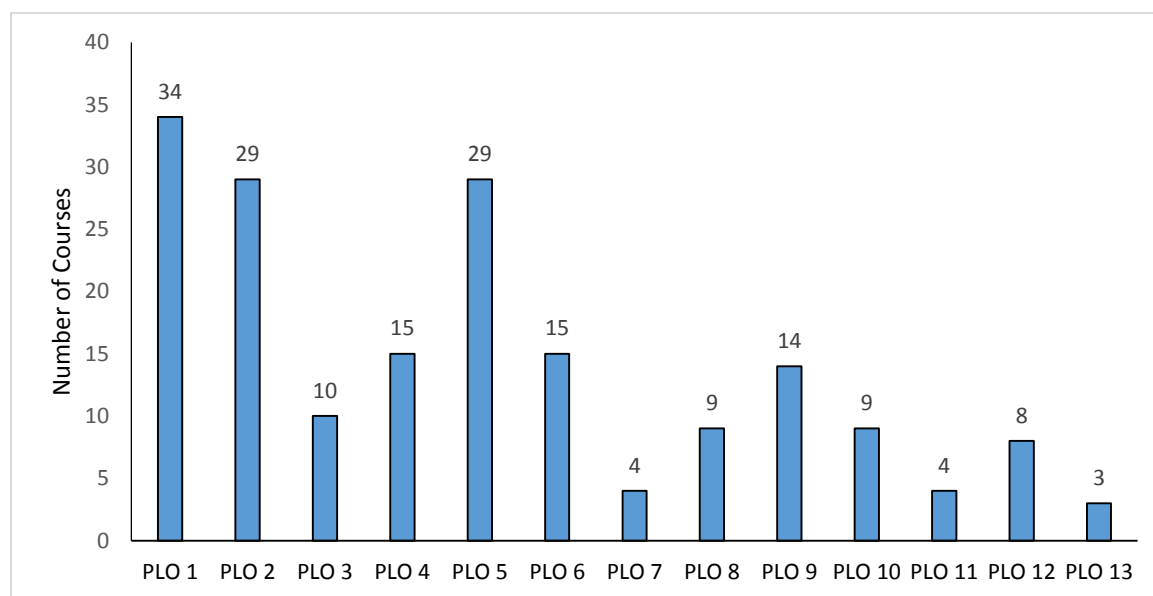


Fig. 1-1. Relationship of number of courses to PLO in BFF programme

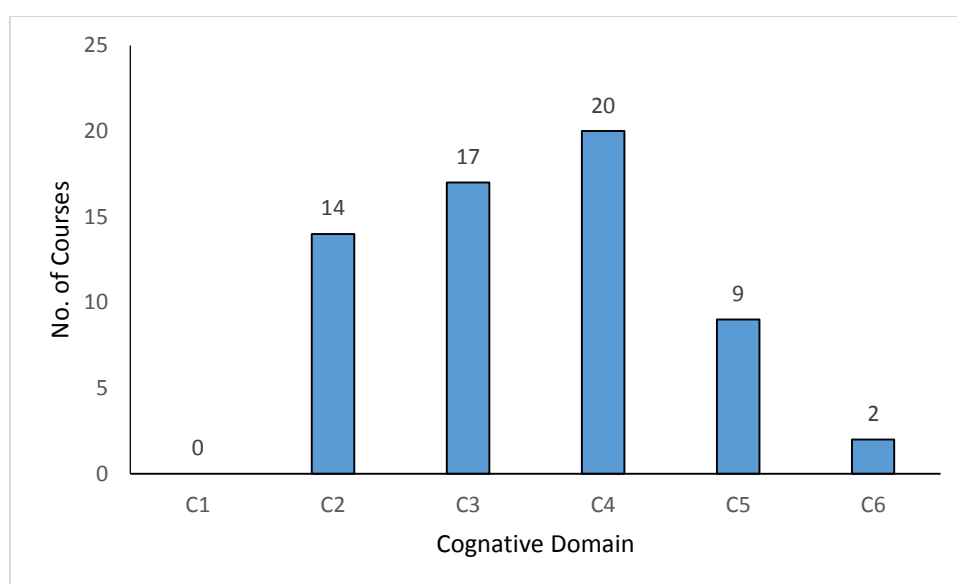


Fig. 1-2. Relationship of number of courses to levels in cognitive domain

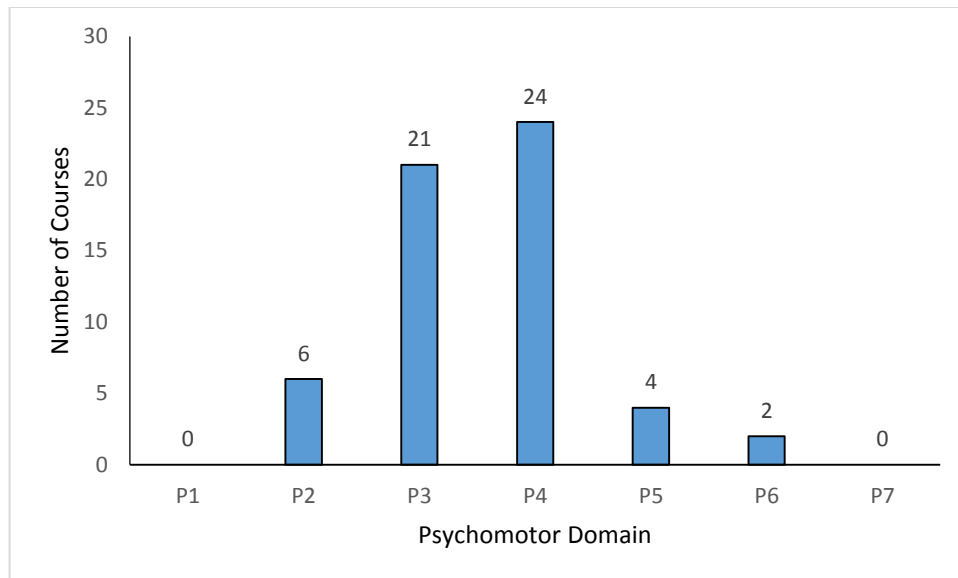


Fig. 1-3. Relationship of number of courses to levels in psychomotor domain

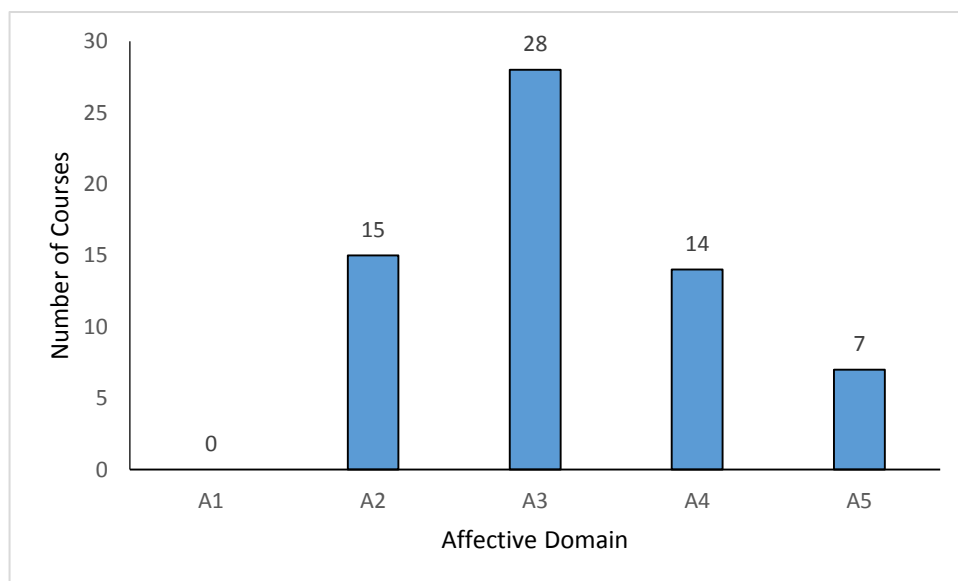


Fig. 1-4. Relationship of number of courses to levels in affective domain

## 2 ATTAINMENT OF PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

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### 2.1 PEO Assessment Methodology

The attainment of PEO in graduates focuses on measuring FKAAB Alumni that have already graduated between 3 to 5 years. Measurements were also done on FKAAB Alumni that have already graduated more than 3 years and over 5 years. FKAAB adopts a triangular-shaped PEO assessment methodology which comprised of two types of measurement namely indirect and direct measurements, as illustrated in Fig. 2-1. These two types of measurement targets two groups of respondents – the Employer and the Alumni. The assessment methods are: (1) Employer Survey (an indirect measurement); (2) Alumni Survey (an indirect measurement); and (3) Alumni Survey (a direct measurement). An indirect measurement refers to measurement based on the perception of respondent towards the Alumni, while a direct measurement refers to real or actual achievement of the Alumni. These measurements are performed once in every 2 to 3 years.

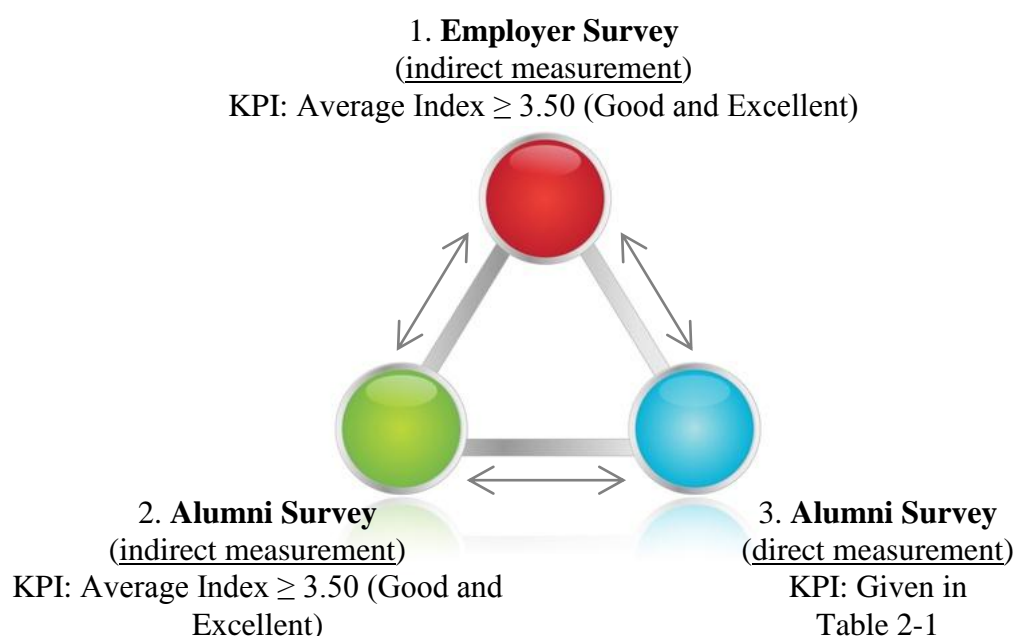


Fig. 2-1. PEO Assessment Methodology in FKAAB

## **2.2 PEO Achievement Key Performance Indicator**

The Key Performance Indicators (KPI) for direct measurement PEO achievement are consistently reviewed with the recent most continuous quality improvement resulting in a better and more realistic success criteria as presented in Table 2-1. This direct measurement refers to the Alumni Survey explain in Fig. 2-1. For indirect measurement, the KPI of Employer Survey and the KPI of Alumni Survey is more than an Average Index of 3.50 indicating Good rating and above for every PEO. These KPI for indirect measurement are illustrated in Fig. 2-1.

## **2.3 PEO Assessment Questionnaire**

Three methods of assessment for PEO have been described in the previous section as shown in Fig. 2-1, one for Employer (indirect measurement), and two for Alumni (indirect and direct measurement). Two sets of Questionnaire Survey, each for Employer and Alumni are presented in Appendix 2-1 and Appendix 2-2, respectively. The questions inside these surveys have been reviewed and improved thoroughly as a result of the many years of OBE practice in FKAAB. The tool used to disseminate the Questionnaire Survey is Google Form. This tool allows flexible and easy respondent access as well as easy and fast analysis on the part of OBE team in FKAAB.

In Employer Survey and Alumni Survey (part for indirect measurement), the respondents were asked to provide feedback on graduate attainment of the PEO's and their strength of their attributes contributed in the organisation on a Likert-scale of 1 (very poor) to 5 (excellent). Each category of PEO is supported by at least two other questions to improve the validity of the outcome. The rating of all responses were analysed and converted into percentage of the total respondents, hence the unit used in the following graphs is percentage. Subsequently, an average index rating is calculated to represent the assessed attribute. This average index rating is interpreted as 5 being excellent and 1 being very poor as given in Table 2-2.

Table 2-1. Direct measurement PEO achievement KPI

PEO	KPI Success Criteria
1  KNOWLEDGE; TECHNICALLY COMPETENT	Each of the following criteria to be satisfied for the fulfilment of this PEO:  i. 50% of respondents have been promoted OR offered a better position. ii. 50% of respondent involved in research OR construction/design project proposal either as member or leader. iii. 2% of respondents are already Professional Engineer (PE). iv. 5% of respondents have published papers in conference/ journal OR written technical reports.
2  COMMUNICATION; LEADERSHIP	Each of the following criteria to be satisfied for the fulfilment of this PEO:  i. 50% of respondent involved in research OR construction/design project proposal either as member or leader. ii. 5% of respondents have published papers in conference/ journal OR written technical reports. iii. 50% of respondents have held leadership positions for a taskforce OR project within an organization.
3  PROBLEM SOLVING	Each of the following criteria to be satisfied for the fulfilment of this PEO:  i. 50% of respondents have been involved in construction/design projects. ii. 50% of respondents have been involved in research projects related to civil engineering.
4  ENTREPRENEURSHIP LIFE-LONG LEARNING	Each of the following criteria to be satisfied for the fulfilment of this PEO:  i. 20% of respondents have been attending Professional Development Courses. ii. 5% of respondents furthering or have furthered their studies. iii. 5% of respondents have ventured into business (self-owned or partnership).

Table 2-2. Interpretation to average index (AI) rating

Average Index (AI)	Interpretation
4.5 to 5.0	Excellent
3.5 to 4.49	Good
2.5 to 3.49	Average
1.5 to 2.49	Poor
1.0 to 1.49	Very Poor

### **What the Employer says about UTHM Alumni? – Employer Survey 2020**

From March to September 2020, an Employer Survey was sent out electronically to a total of 224 respondents were Employers who rated their employees (Alumni) that have graduated from FKAAB UTHM. These Alumni who have graduated from FKAAB UTHM are sub-divided in accordance to the number of years that they have graduated from FKAAB UTHM. The analysis of the survey were divided into three categories of respondents, which are based on their working experience of (1) less than 3 years (2) 3 to 5 years (3) 6 to 10 years and (4) more than 10 years.

57 respondents corresponding to Alumni who graduated 3 to 5 years, it is observed that the majority (27%) of Alumni works in Contractor firms followed by Government related agencies (11%) and Consultant firms (9%). This is presented in Figure 2.2.

A total of 20 questions have been given to the Employer (Appendix 2-1) to assess the Alumni. The 20 questions have been designed such that they are grouped to assess each of the 4 PEO. The overall summary attainment of PEO for Alumni graduated 3 to 5 years resulting from the Employer Survey is given in Figure 2.3.

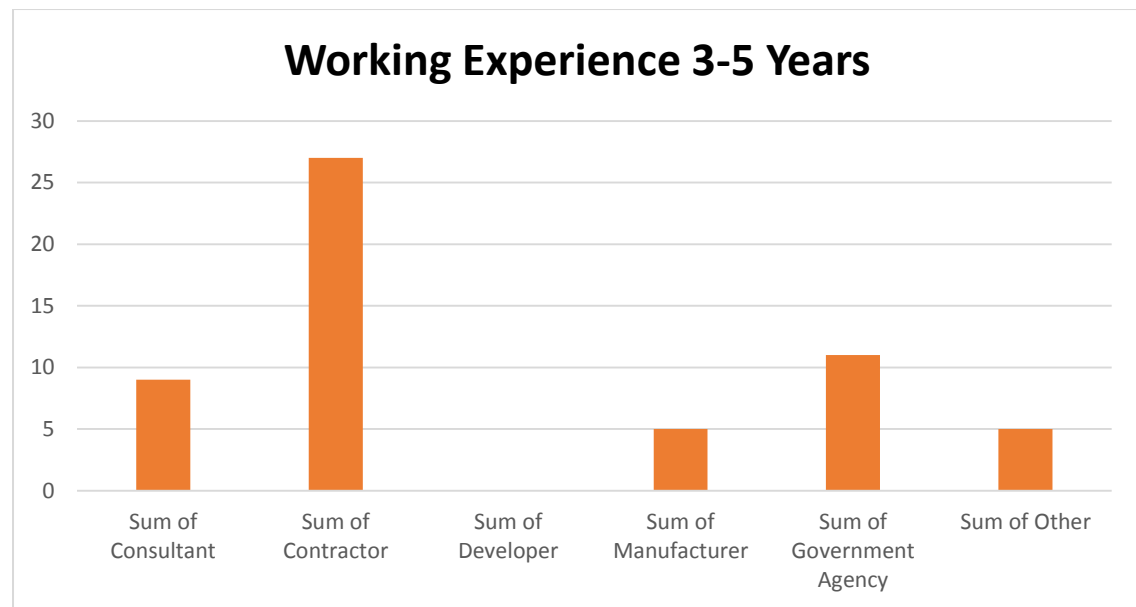
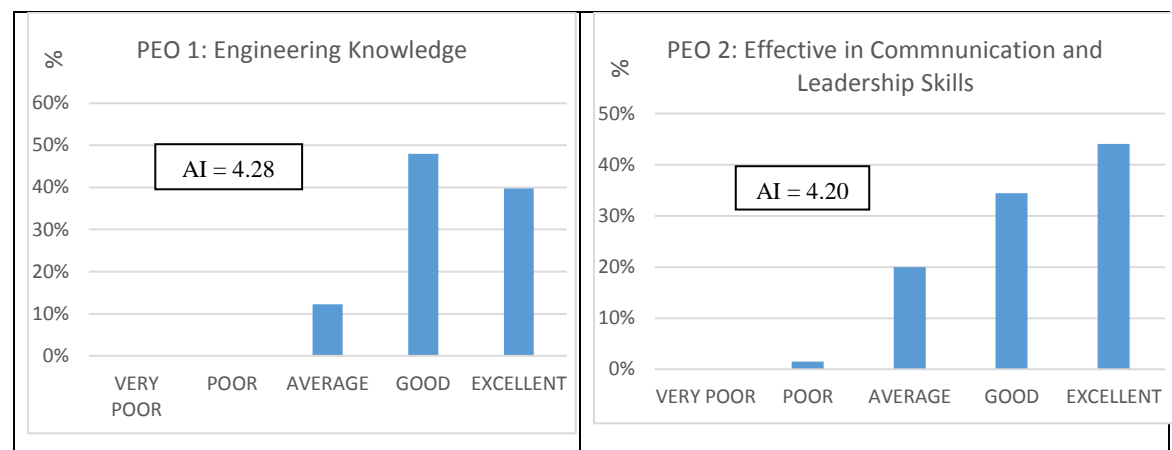


Figure 2.2: Percentages of Alumni who graduated 3 to 5 years working in different type of firms

Based on Figure 2.3, it is evidential that PEO 1, PEO 2, PEO 3, PEO 4 have achieved its KPI criteria of AI 3.50 with each reading AI of 4.28, 4.20, 4.37, 4.32, respectively.



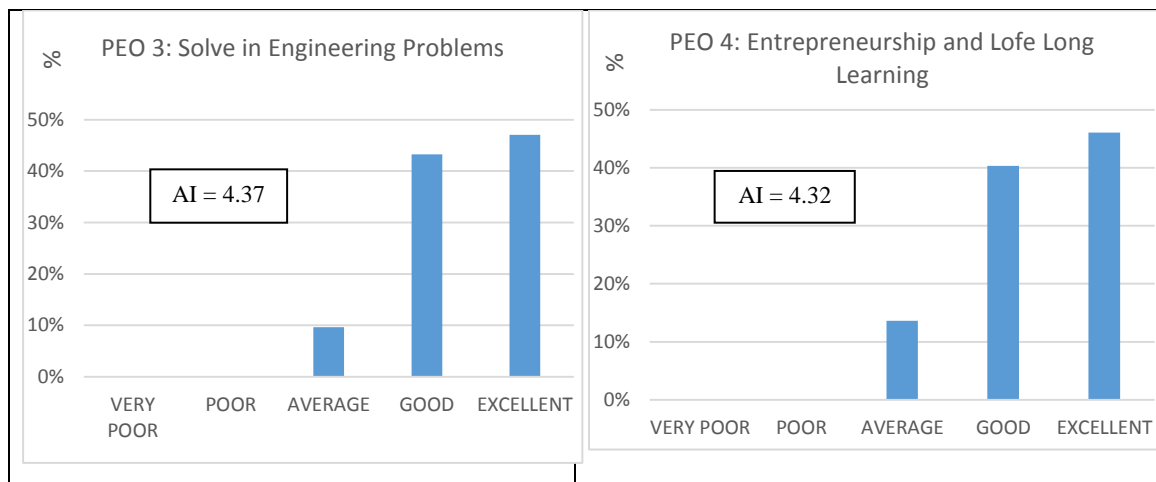
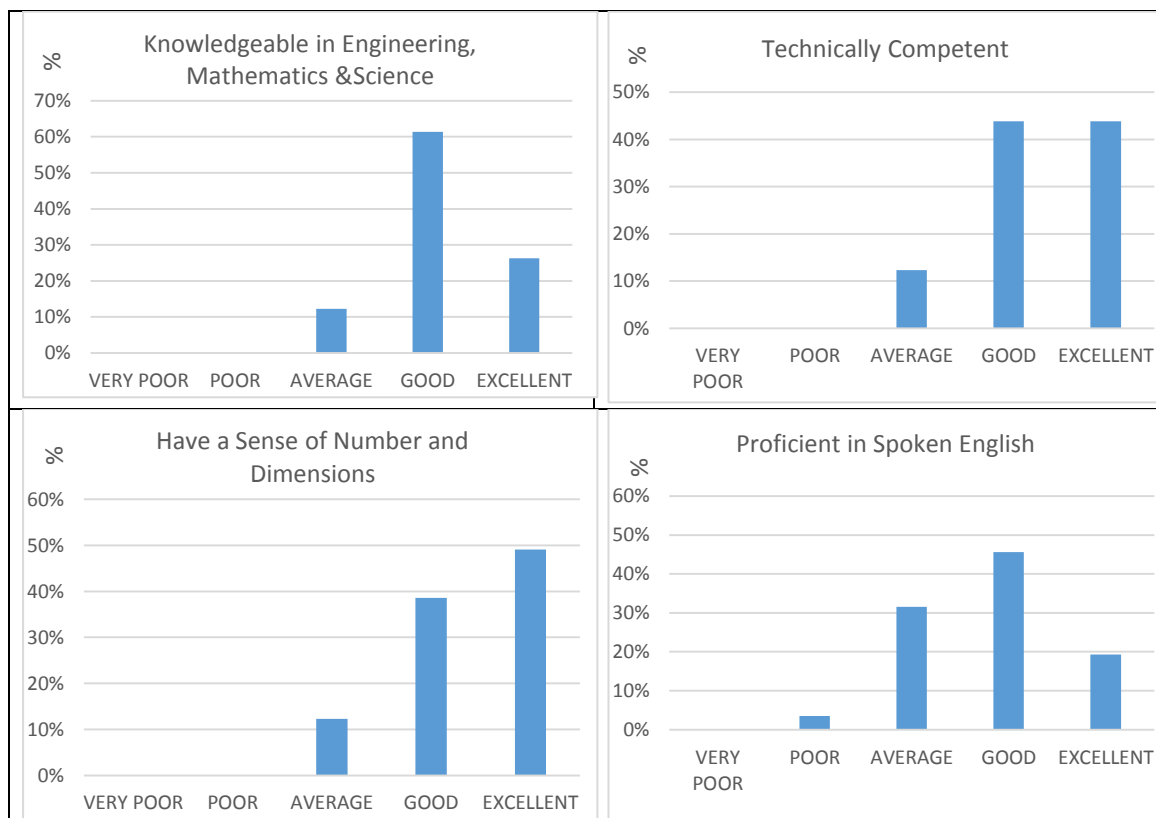


Figure 2.3: Employer Survey indirect measurement on Alumni with 3 to 5 years of working experience – one's perception on the attainment of PEO 1, PEO 2, PEO 3, PEO 4

Detailed breakdown characteristics for each PEO relating to the questions asked have been reviewed and analysed in order to find the strength areas or areas which require further improvement (Figure 2.4 and Figure 2.5).



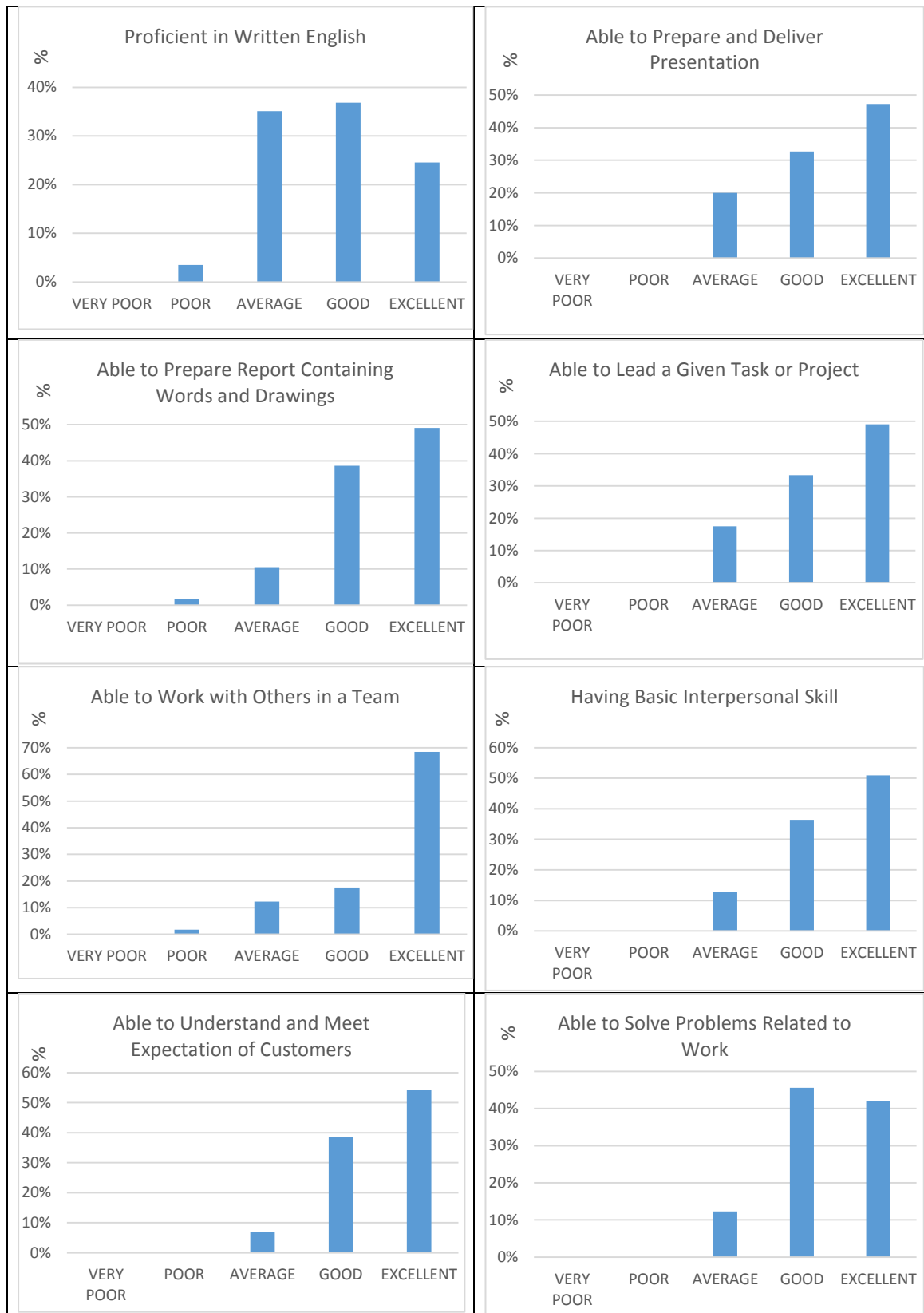


Figure 2.4: Employer Survey indirect measurement on Alumni with 3 to 5 years of working experience – breakdown characteristics (Q1 to Q12) for all PEO

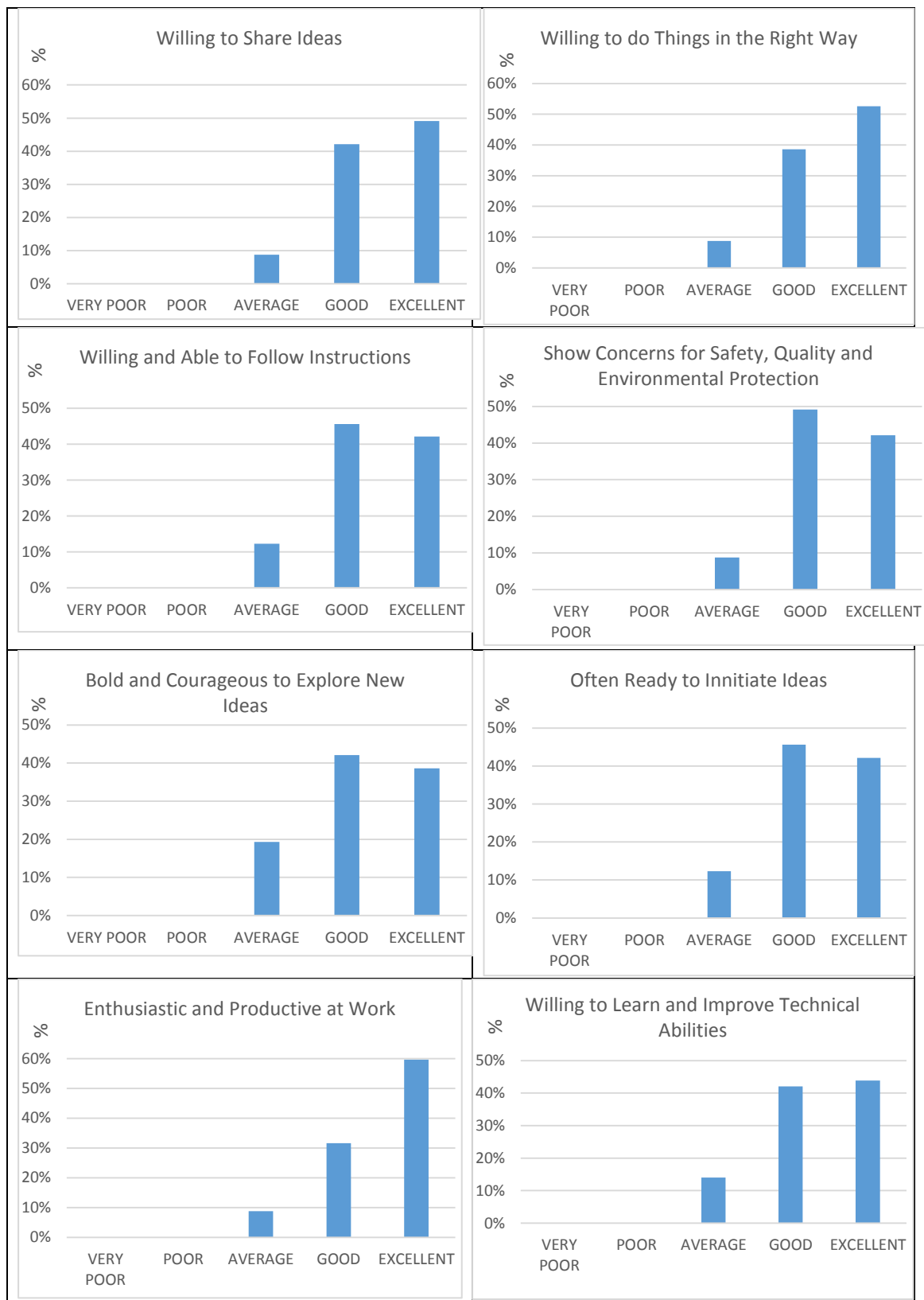


Figure 2.5: Employer Survey indirect measurement on Alumni with 3 to 5 years of working experience – breakdown characteristics (Q13 to Q20) for all PEO

Based on the breakdown characteristic analysis of the Employer Survey, the areas of strength and areas to be improved have been identified. These areas are interpreted as perception of the Employer towards the Alumni. Areas of strength are taken as characteristics with Average Index, AI greater than 4.20; and areas to be improved as characteristics with Average Index, AI less than 4.00. From the responds, all questions give AI more than 4.2 except Q1, Q4 and also Q5. The lowest AI for Q4 and Q5 are 3.81 and 3.82, respectively.

## **2.4 What the Alumni perceive of themselves? – Alumni Survey 2020**

Alumni Survey consists of two parts: indirect and direct measurements of PEO attainment. The survey was performed from March to September 2020. The analysis of the survey were divided into three categories of respondents, which are based on their working experience of (1) less than 3 years (2) 3 to 5 years (3) 5 to 10 years and (4) more than 10 years. For the purpose of reporting, only results of (2) 3 to 5 years are presented.

The indirect measurement of the survey is based on self-evaluation or self-perception of the Alumni on the attainment of PEO within oneself. In the direct measurement survey, the attainment of PEO is evaluated based on 3 criteria:

- i. Employment history since graduated;
- ii. Actual or real professional achievement and contribution; and
- iii. Features of professional development and entrepreneurship.

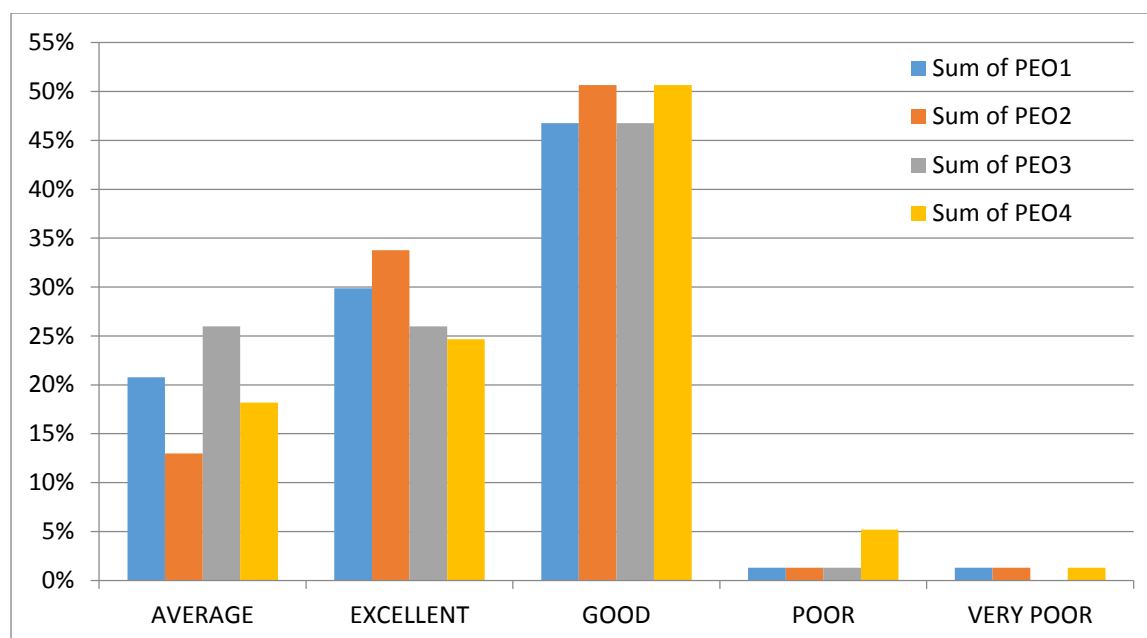


Figure 2.6: Alumni Survey indirect measurement on alumni with 3 to 5 years of working experience – one's perception on the attainment of PEO 1, PEO 2, PEO 3, PEO 4

**Error! Reference source not found.** Figure 2.6 shows the summary analysis of all the PEO attainment for alumni who have working experiences of 3 to 5 years. The analysis shows that the attainment for all the PEO are above the KPI criteria of Average Index (AI) 3.50, for PEO 1 AI = 3.97; PEO 2 AI = 4.10; PEO 3 AI = 3.91; and PEO 4 AI = 3.87.

## 2.5 Alumni's real achievements through direct measurement

The direct survey on alumni's attainment on all the PEO was evaluated by measuring their actual involvement in the organization based on their employment history since their graduation, their professional achievement and contribution, and their professional development. Table 2.3 to Table 2.6 shows a summary analysis of Alumni Survey direct measurement for PEO 1 to PEO 4, respectively.

Table 2.3: Alumni Survey direct measurement for PEO 1 – Knowledge, Technically Competent

Direct measurement question	Percentage answering		KPI
	Yes	No	
Have been promoted or offered to a better position	77	26	50% KPI achieved
Have been involved in research/construction project proposal either as member or leader	68	32	50% KPI achieved
Are you a Professional Engineer (PE)	5	95	2% KPI achieved
Have published papers in conference/journal	32	68	5% KPI achieved

Table 2.4: Alumni Survey direct measurement for PEO 2 – Communication, Leadership

Direct measurement question	Percentage answering		KPI
	Yes	No	
Have been involved in research/construction project proposal either as member or leader	68	32	50% KPI achieved
Have published papers in conference/journal	32	68	5% KPI achieved
Have held leadership positions for a taskforce or project within an organization	73	26	50% KPI achieved

Table 2.5: Alumni Survey direct measurement for PEO 3 – Problem Solving

Direct measurement question	Percentage answering		KPI
	Yes	No	
Have been involved in civil engineering design/construction projects	58	42	50% KPI achieved
Have been involved in research and/or development projects related to civil engineering	52	47	50% KPI achieved

Table 2.6: Alumni Survey direct measurement for PEO 4 – Entrepreneurship, Life long learning

Direct measurement question	Percentage answering		KPI
	Yes	No	
Have been attending Continuous Professional Development courses	58	42	20% KPI achieved
Have furthered studies to a higher degree	32	68	5% KPI achieved
Have ventured into business (self-owned or partnership)	16	84	5% KPI achieved

## 2.6 Summary on PEO attainment

On the basis of PEO assessments performed in 2020: Employer Survey (indirect measurement) and Alumni Survey (direct and indirect measurement), analysis have found that all PEO 1 to PEO 4 have attained the pre-determined goals or KPI.

### 3 ATTAINMENT OF PROGRAMME LEARNING OUTCOMES (PLO)

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#### 3.1 PLO Assessment Methodology

Similar to PEO assessment methodology, the assessment method for PLO also applies to a triangular-shaped concept as shown in Figure 3-1, which includes (1) Course Learning Outcome versus Programme Learning Outcome (CLO-PLO) Assessment; (2) Fundamental Civil Engineering Exam (FCEE); and (3) Exit Survey. The achievement of each PLO is considered as attained when all the three above mentioned assessment methods satisfy an average mark of not less than 55%.

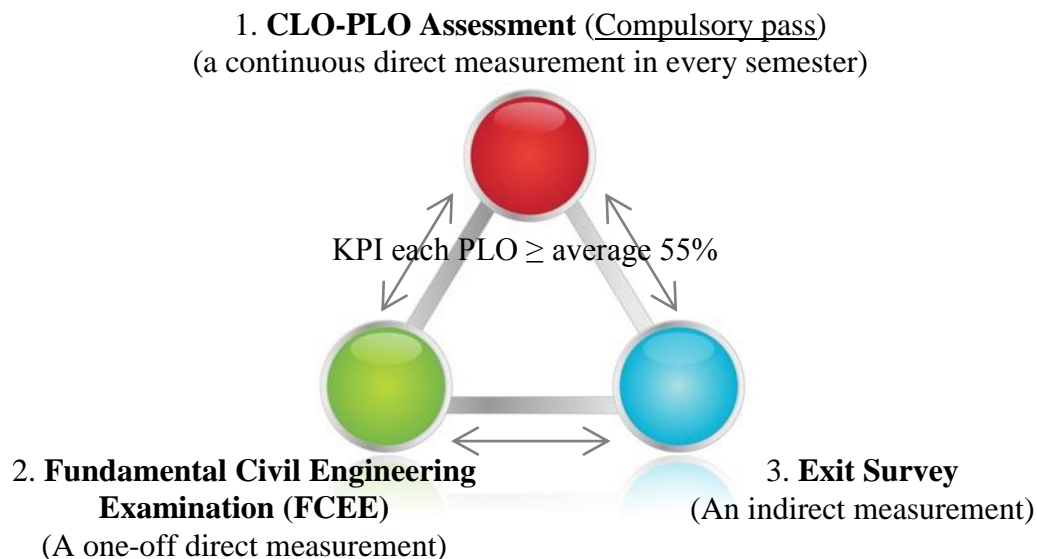


Fig. 3- 1. PLO assessment methodology in FKAAS

### 3.2 Course Learning Outcome versus Programme Learning Outcome (CLO-PLO) Assessment

CLO-PLO assessment is performed all through the semester within every course. For every course, there are 3 CLO mapped one PLO each for domain Cognitive (C), Psychomotor (P) and Affective (A), respectively. Table 3-1 provides the assessment tool and marks distribution for CLO based on the type of course with final exam and without final exam. Courses without final exam are then divided into two parts which are laboratory and computer as primary teaching courses where the marks are focused on both Psychomotor and Affective.

Table 3- 1. Typical assessment tool and marks distribution for CLO

CLO	PLO	Domain	Assessment Tool	Course with Final Exam	Courses without Final Exam (Laboratory Courses)	Courses without Final Exam (Computer as Primary Teaching)
				Marks (%)		
1	1 <sup>st</sup> PLO	Cognitive	Quizzes			
			Assignments	50	60	40
			Tests			
			Project			
			Exam			
2	2 <sup>nd</sup> PLO	Psychomotor	Project	7.5	20	30
3	3 <sup>rd</sup> PLO	Affective	Project	7.5	20	30
Total					100	

In Semester 2 Sessions 2019/2020, the assessment tool and marks distribution has slightly changed due to the Covid – 19 Pandemic after a thorough discussion among the top management at the faculty level. All classes were conducted using an online platform starting from week 4 to week 14 due to Movement Control Order (MCO). The change of

assessment tools and marks is presented in Table 3.2. It was decided that there will be no test during that semester, therefore the marks for quizzes and assignments were increased from 5 % to 10 % and 5 % to 20 % respectively. The final exam was also conducted via an online platform and still carried 50 % from total marks.

Table 3.2: Typical assessment tool and marks distribution for CLO for Semester 2 Session 2019 / 2020 (During MCO)

CLO	PLO	Domain	Assessment Tool	Marks (%)
1	1 <sup>st</sup> PLO	Cognitive	Quizzes	10
			Assignments	20
			Project	5
			Exam	50
2	2 <sup>nd</sup> PLO	Psychomotor	Project	7.5
3	3 <sup>rd</sup> PLO	Affective	Project	7.5
Total				100

Another set of courses without Final Examinations where is based on computer as primary teaching and learning method such as Computer Programming, Civil Engineering Software Application and Engineering Drawing and CAD, the assessment tool and marks distribution for CLO used for direct assessment is presented in Table 3.3.

Table 3.3: Typical assessment tool and marks distribution for CLO for courses based on computer as primary teaching and learning method such as Computer Programming, Civil Engineering Software Application and Engineering Drawing and CAD

CLO	PLO	Domain	Assessment Tool	Marks (%)
1	1 <sup>st</sup> PLO	Cognitive	Quizzes/ Assignments	10
			Tests	20
			Project	10
2	2 <sup>nd</sup> PLO	Psychomotor	Project	30
3	3 <sup>rd</sup> PLO	Affective	Project	30
Total				100

The CLO-PLO results for each course are automatically generated by a university centralised system known as Total Campus Integrated System (TCIS). Statistical distribution in tabulated and graph formats are given as shown in Figure 3-2 for course marks overall report and Figure 3-3 for course OBE overall report.

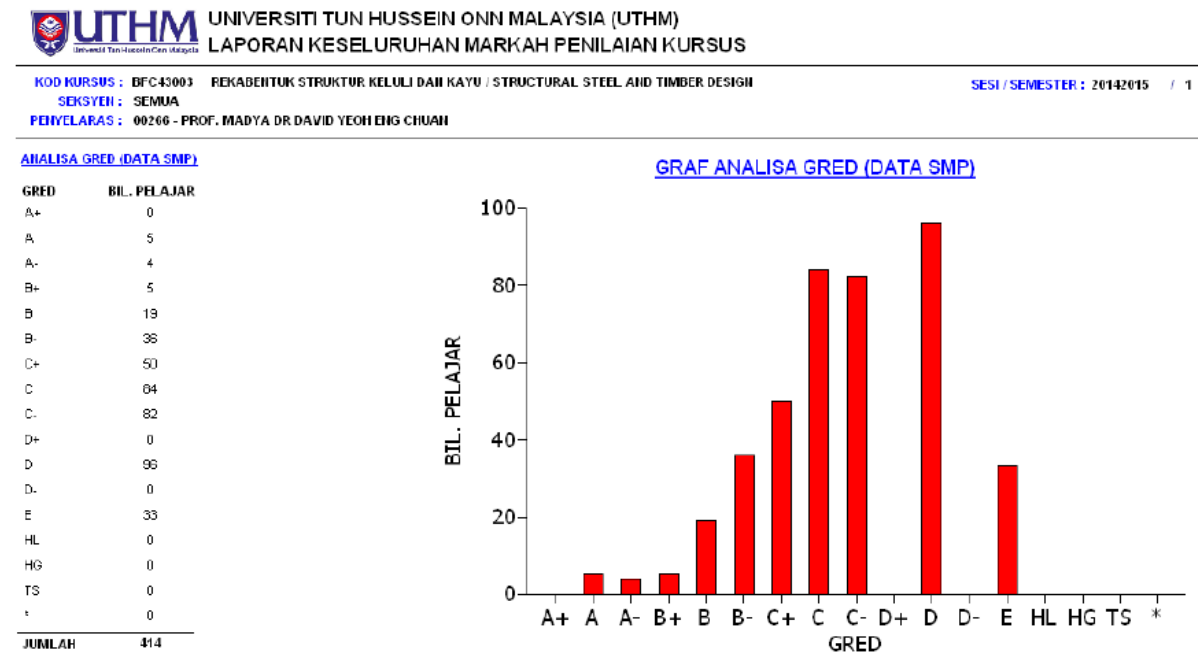


Fig. 3- 2. Typical Assessment of marks for a course

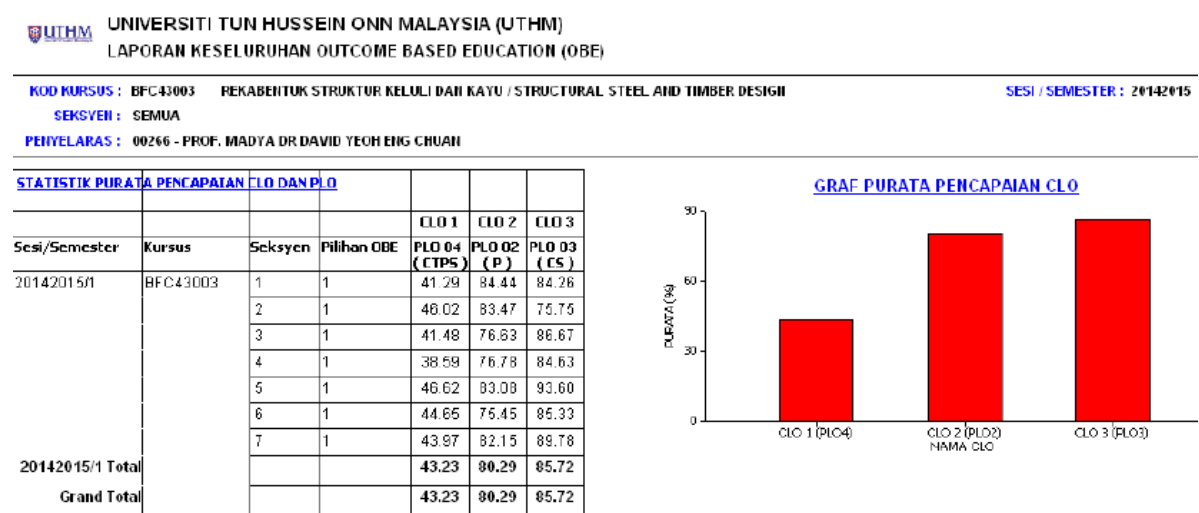


Fig. 3- 3. Typical OBE Overall Report for a course

The CLO-PLO achievement for 2 semesters of year 2020 is presented in Figure 3-4, respectively. The first success criterion / KPI for each PLO attainment are that the average mark of the courses addressing the PLO is at least 55%.

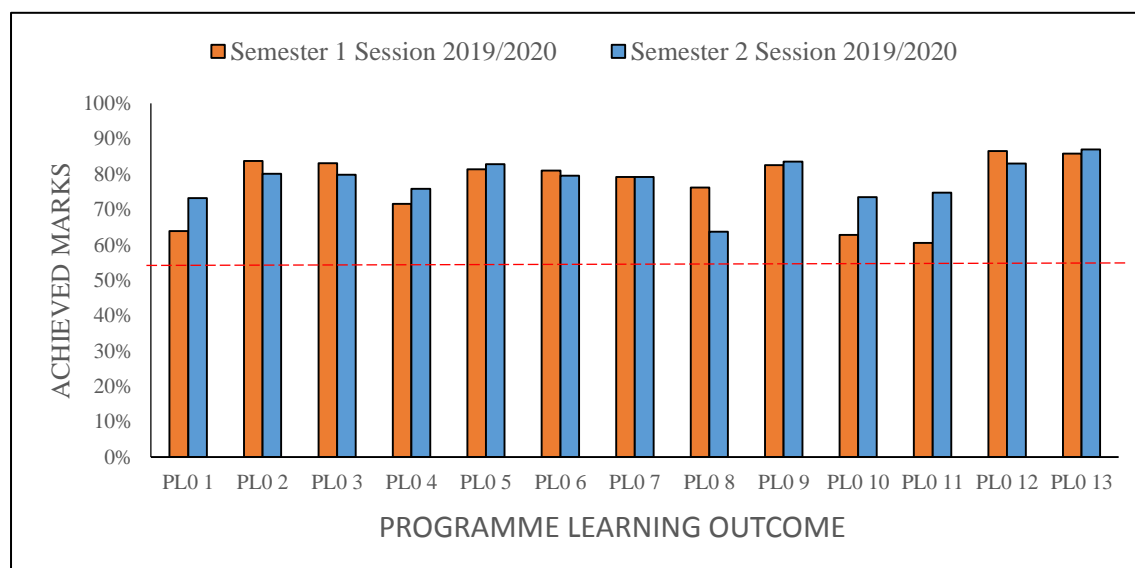


Fig. 3- 4. CLO-PLO achievement for BFF programme in Semester 1 and Semester 2 Session 2019/2020

The second success criterion / KPI used to measure the achievement of PLO is at least 50% of students within each cohort / section achieve 55% marks as illustrated in Fig. 3-5 for a single course. This latter success criterion focuses on the student numbers while the former success criterion focuses on the PLO marks.

**Overall CLOs ACHIEVEMENT REPORT ( Previous )**

OBE Option	CLOs	PLOS	KPI		Achieved KPI		Remarks
			%	%	No.	%	
			Students	Marks	Students	Students	
1	CLO 1	PLO 04 ( CTPS )	50	55	46 / 335	13.73	Not Achieved
2	CLO 1	PLO 10 ( DS )	50	55	14 / 79	17.72	Not Achieved
1	CLO 2	PLO 02 ( P )	50	55	307 / 335	91.64	Achieved
2	CLO 2	PLO 09 ( LS )	50	55	65 / 79	82.28	Achieved
1	CLO 3	PLO 03 ( CS )	50	55	332 / 335	99.10	Achieved
2	CLO 3	PLO 05 ( TS )	50	55	79 / 79	100.00	Achieved

**Overall CLOs ACHIEVEMENT REPORT ( Current )**

OBE Option	CLOs	PLOS	KPI		Achieved KPI		Remarks
			%	%	No.	%	
			Students	Marks	Students	Students	
1	CLO 1	PLO 04 ( CTPS )	50	55	2 / 12	16.67	Not Achieved
2	CLO 1	PLO 10 ( DS )	50	55	117 / 310	37.74	Not Achieved
1	CLO 2	PLO 02 ( P )	50	55	11 / 12	91.67	Achieved
2	CLO 2	PLO 09 ( LS )	50	55	287 / 310	92.58	Achieved
1	CLO 3	PLO 03 ( CS )	50	55	11 / 12	91.67	Achieved
2	CLO 3	PLO 05 ( TS )	50	55	309 / 310	99.68	Achieved

STATISTIK BILANGAN PELAJAR MENDAFTAR KURSUS							
Sesi	Sem	Kod Kursus	Seksyen	Program	DT	UK	Jumlah
2014/2015	1	BFC43003	1	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	53	1	54
			2	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	58	2	60
			3	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	62	1	63
			4	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	51		51
			5	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	48		48
			6	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	62		62
			7	BFF - SARJANA MUDA KEJURUTERAAN AWAM DENGAN KEPULJAN	65	1	66
Jumlah Besar					409	5	414

Fig. 3- 5. Typical example of CLO-PLO assessment with KPI focus on student numbers

### 3.3 Fundamental Civil Engineering Exam (FCEE)

The Fundamental Civil Engineering Exam (FCEE) is a one-off direct measure of final year students' understanding on the fundamental of civil engineering disciplines. FCEE is one of the three tools used to measure students' achievement on the Learning Outcomes (PLO) of Bachelor of Civil Engineering with Honours (see Figure 3-1). Beginning year 2016, resulting from feedbacks and lessons from Benchmark Visits to other universities, External Examiner, and Stakeholders' Symposium, two significant improvements have been made: (1) FCEE focus on assessing only the Cognitive Domain PLO because it is a written exam oriented assessment; and (2) New questions for two sets of FCEE papers which covers the four PLO that are categorised as Cognitive Domain PLO, namely PLO 1 for Engineering Knowledge; PLO 4 for Critical Thinking and Problem Solving; PLO 10 for Design / Development of Solutions; and PLO 11 for Problem Analysis. The date of the FCEE and the number of candidates for year 2020 is shown in Table 3-4.

Table 3- 4. FCEE date and number of candidates in 2020

Year	Semester, Session	Date of FCEE	Number of Student	Total
2020	Semester I, Session 2019/2020	14 Nov 2019	179	545
	Semester II, Session 2019/2020	13 June 2020	367	

The FCEE was conducted online via Google forms. The FCEE format is the same for paper-based which was used in the previous years. It consists of 40 multiple-choice questions, to be completed in 2 hours. The FCEE constitutes 20% of the grade in the Integrated Design Project course. Different set of FCEE is administered each academic year. The exam covers most of the Civil Engineering courses, including Construction Management, Structure and Materials, Highway and Traffic, Geotechnical, Environmental, Hydraulics and Hydrology, and Surveying. Table 3-5 lists the breakdown of the questions according to the varying courses covered in the FCEE.

Table 3- 5. Number of questions according to subjects in the new format of FCEE paper

Subjects	Number of Questions
Water Resources & Environmental Engineering	10
Structure & Materials Engineering	10
Survey, Geotechnical Engineering, Traffic & Highway Engineering	10
Construction Engineering & Sustainable Management	10
Total	40

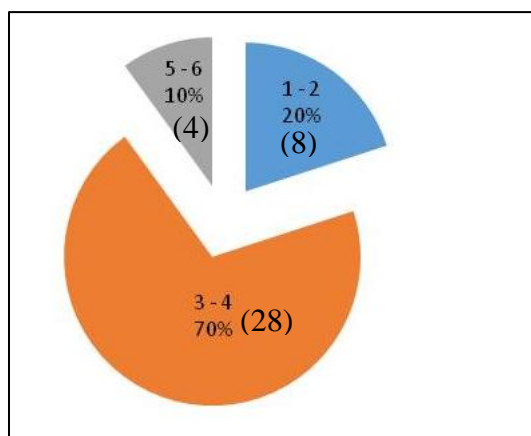


Fig. 3- 6. Typical of FCEE questions ( ) follows the taxonomy level

Figure 3-6 shows the distribution of the FCEE questions follows the taxonomy level. Each PLO has 10 questions and out of the 40 questions, 20% (8 questions) have the taxonomy levels 1 & 2, 70% (28 questions) in taxonomy levels 3 & 4, and 10% (4 questions) in taxonomy levels of 5 and higher. A dominant of 70% of the FCEE questions were designed in taxonomy level 3 & 4 because these levels correspond to graduates of Bachelor of Civil Engineering with Honours that should be able to apply the knowledge of mathematics, natural science, engineering fundamentals and civil engineering specialization to solve complex civil engineering problems.

In Semester II Session 2019/2020, during the COVID-19 Pandemic situation, FCEE was still conducted via online but with an open-book approach. It consists of 4 subjective questions, to be completed in 4 hours. Each question has equal marks distribution and covered one of the major civil engineering field such as Structures and Materials Engineering, Water Resources and Environmental Engineering, Geomatic, Geology, Geotechnical Engineering, Traffic and Highway Engineering, Construction Engineering and Construction Management respectively. Similar to the approach in the previous years, each question has the same level of difficulty in which the marks distribution is based on the Taxonomy Bloom Level: level 1 & 2 (20%), level 3 & 4 (70%) and level 5 & 6 (10%). Table 3.5 lists the breakdown of the questions according to the varying courses covered in the FCEE. The FCEE for Semester II Session 2019/2020 still constitutes 20% of the grade in the Integrated Design Project course.

Table 3.6: Number of subjective questions according to the major civil engineering fields in the new format of FCEE Paper in Semester II Session 2019/2020 using Open-Book approach.

Subjects	Number of Questions
Water Resources & Environmental Engineering	1
Structures & Materials Engineering	1
Geomatic, Geology, Geotechnical Engineering, Traffic and Highway Engineering	1
Construction Engineering & Construction Management	1
<b>Total</b>	<b>4</b>

The overall PLO achievement for semester 1 and 2 session 2019/2020 is shown in Fig. 3-7. It is seen that the PLO achievement for semester 2 is higher than semester 1 for session 2019/2020 except for PLO 4 the achievement decrease from 69.9 % to 57.9 %.

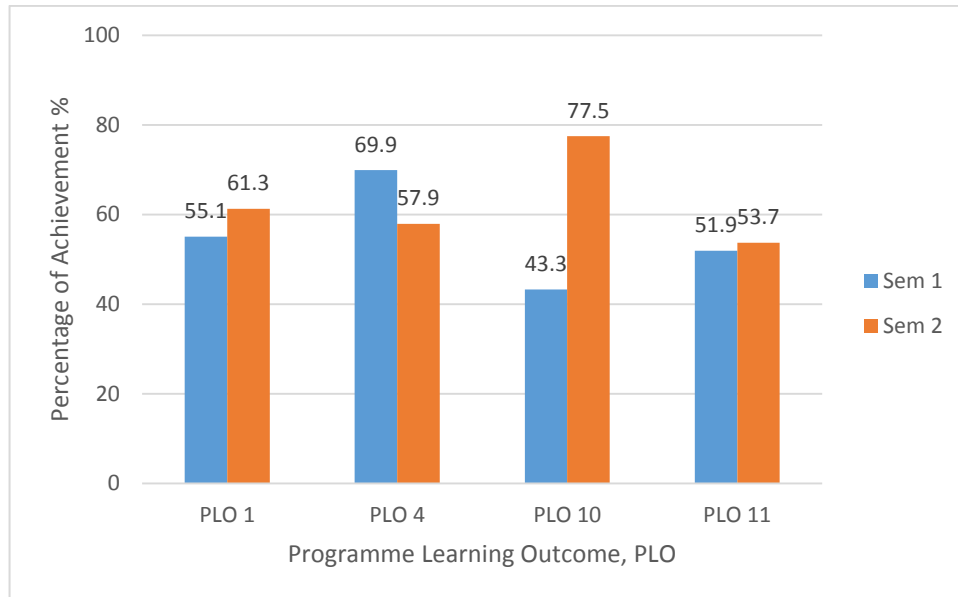


Fig. 3-7. FCEE PLO achievement for year 2020

The following are activities recommended to improve students' performance in the upcoming FCEE:

1. Student briefing on FCEE should be carried out by the coordinator during the first meeting of Integrated Design Project course to ensure that the students are well prepared for the exam;
2. The FCEE questions should be reviewed by professional engineer or adjunct professor to increase its quality and suitability; and
3. More sets of questions should be prepared to increase the reserve of questions, as a different set of FCEE questions is used each semester.

### 3.4 Exit Survey

Exit Survey is an indirect measurement of self-assessment of the PLO based on individual perception as presented in Appendix 3-1. The main objectives of the survey are (1) To determine students' perception on the achievement of PLO in oneself; (2) To determine students' perception on their achievement of soft-skills attributes listed within the PLO; and (3) To evaluate students' satisfaction level towards learning and teaching aspects, academic management, and university facilities. The tool used to perform this survey is Google Form. This survey is normally completed by all graduating students during their convocation.

The Exit Survey was conducted for the year 2020 in the month of October. The respondents are the graduating students of that year. The general statistics of the graduates are shown in Table 3-7.

Table 3- 7. General statistic of the graduates for year 2020

Year	2020
Number of graduates	491
Male percentage	49%
Female percentage	51%

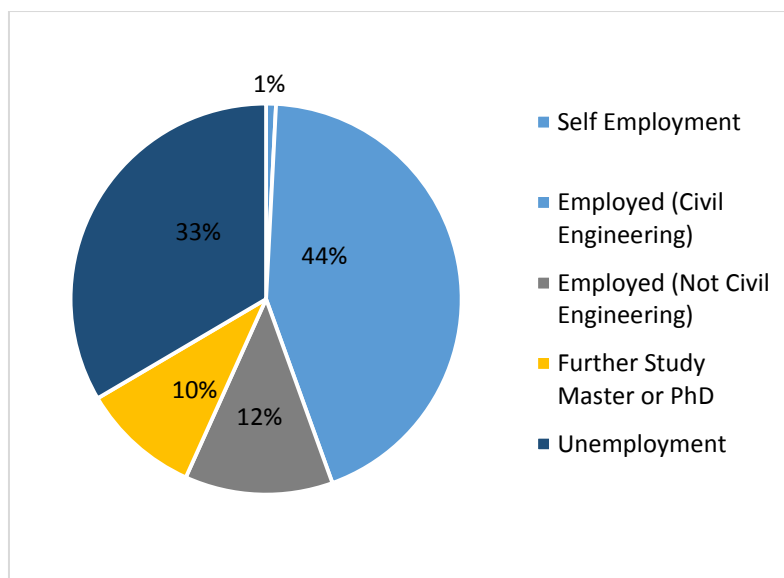


Fig. 3-8. Employment statistics of graduates 4 months after final semester exam for year 2020

Detailed statistics of the Exit Survey result are given in Fig. 3-8. The Exit Survey for 2020 showed that 44 % of FKAAS graduates, within 4 months after their final semester examination have been offered employment in the Civil Engineering industry. There are 12 % of the graduates are employed but are not working in the field of civil engineering. There are also only 10 % of the graduates who are pursuing their education in postgraduate studies. Finally, the statistics also showed that 33 % of the graduates are not employed yet.

In gauging the PLO attainment, respondents were asked to evaluate themselves on a scale of 1 (very poor) to 5 (excellent) according to level of attainment. Table 3-8 and Fig 3- 9 shows the summary of PLO achievement where graduating students perceived their own PLO attainment at a level of good (scale 4) or excellent (scale 5) score.

Table 3- 8. Exit Survey PLO achievement – % of students responded good (scale 4) or excellent (scale 5) score for year 2020

PLO	Taxonomy	Year 2020
1 K	C	84
2 PS	P	80
3 CS	P	81
4 CTPS	C	79
5 TW	A	86
6 LL	A	84
7 ES	P	83
8 ET	A	87
9 LS	P	84
10 DDS	C	81
11 PA	C	78
12 ESus	A	82
13 ESoc	A	82

Note: **C** is Cognitive, **P** is Psychomotor, and **A** is Affective

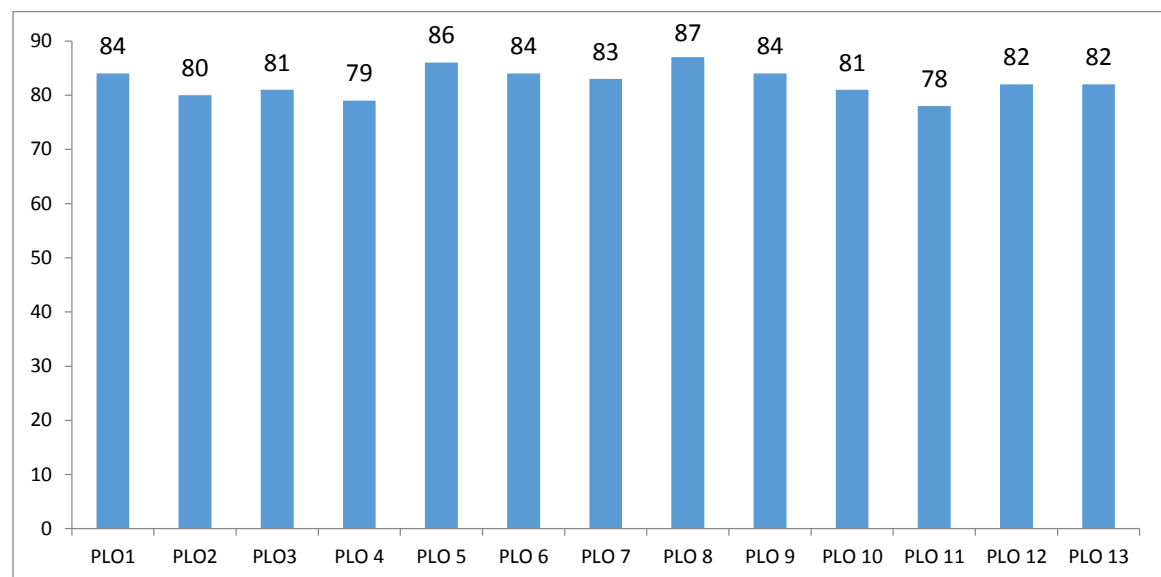


Fig. 3 - 9. Exit Survey PLO achievement – % of students responded good (scale 4) or excellent (scale 5) score for year 2020

A clear lesson from the data in Table 3-8 and Figure 3 - 9 shows that in general, many graduating students perceived themselves to have lower command of the Cognitive PLO but stronger command of the Psychomotor and Affective PLO.

### 3.5 Continuous Quality Improvement (CQI) Efforts

In order to improve CLO within the teaching learning of a particular course, various strategies can be proposed by the lecturer for the different area of concern. This is generated in a format known as CQI Report for CLO as shown in Fig. 3-10. The proposed strategy for improvement is suggested and passed onto the next lecturer automatically via a course management system.



 <b>UNIVERSITI TUN HUSSEIN ONN MALAYSIA</b> <b>CQI REPORT FOR CLOs</b>			
Session / Sem : 20152016 / 1 Course Code : BFC43303 Course Name : PROJEK REKABENTUK BERSEPADU / INTERGRATED DESIGN PROJECT			
<b>CLO 1</b> Design the building structures and infrastructures for complex engineering based on relevant guidelines.		<b>KPI : At least 50% of students have achieved 55 marks and above</b> Setting : 2	
<b>PLO 10 (DS)</b>	<b>Achievement of Previous Semester ( 20142015 / 2 )</b> Passed / No of Students : 252 / 252    Remarks/Status : <b>100%</b> <b>Achieved</b>	<b>Achievement of Current Semester ( 20152016 / 1 )</b> Passed / No of Students : 151 / 152    Remarks/Status : <b>99.34%</b> <b>Achieved</b>	
<b>Area of Concern</b>	<b>Proposed Strategy</b>	<b>Upcoming Strategy</b>	
1. Student Performance	Let students critical thinking	Closing monitoring by Ir lecturer	
2. Course Contents	Provide more notes	Add green building component	
3. Delivery Methods	Student group selected by lecture	Give more example as per industry practice	
<b>CLO 1</b> Design the building structures and infrastructures for complex engineering based on relevant guidelines.		<b>KPI : At least 50% of students have achieved 55 marks and above</b> Setting : 2	
<b>PLO 10 (DS)</b>	<b>Achievement of Previous Semester ( 20142015 / 2 )</b> Passed / No of Students : 252 / 252    Remarks/Status : <b>100%</b> <b>Achieved</b>	<b>Achievement of Current Semester ( 20152016 / 1 )</b> Passed / No of Students : 151 / 152    Remarks/Status : <b>99.34%</b> <b>Achieved</b>	
<b>Area of Concern</b>	<b>Proposed Strategy</b>	<b>Upcoming Strategy</b>	
4. Assessment Methods	Provide guideline student presentation	Provide guideline student presentation	
<b>CLO 2</b> Organize a project in team effectively as well as an individual		<b>KPI : At least 50% of students have achieved 55 marks and above</b> Setting : 2	
<b>PLO 09 (LS)</b>	<b>Achievement of Previous Semester ( 20142015 / 2 )</b> Passed / No of Students : 245 / 252    Remarks/Status : <b>97.22%</b> <b>Achieved</b>	<b>Achievement of Current Semester ( 20152016 / 1 )</b> Passed / No of Students : 151 / 152    Remarks/Status : <b>99.34%</b> <b>Achieved</b>	
<b>Area of Concern</b>	<b>Proposed Strategy</b>	<b>Upcoming Strategy</b>	
1. Student Performance	Monitoring minutes meeting closely	Provide studio for design office	
2. Course Contents	Add more notes	Add green building item	
3. Delivery Methods	Let Ir involve in the lecture team	add more example as per industry practice	
4. Assessment Methods	Request external panel industry	add log book for time frame.	
<b>CLO 3</b> Propose a technical knowledge through project report for problem solving in civil engineering works based on relevant guidelines.		<b>KPI : At least 50% of students have achieved 55 marks and above</b> Setting : 2	
<b>PLO 13 (ES)</b>	<b>Achievement of Previous Semester ( 20142015 / 2 )</b> Passed / No of Students : 250 / 252    Remarks/Status : <b>99.21%</b> <b>Achieved</b>	<b>Achievement of Current Semester ( 20152016 / 1 )</b> Passed / No of Students : 146 / 152    Remarks/Status : <b>96.05%</b> <b>Achieved</b>	
<b>Area of Concern</b>	<b>Proposed Strategy</b>	<b>Upcoming Strategy</b>	
1. Student Performance	Let students critical thinking	Provide studio for design office.	
2. Course Contents	Provide more notes	Add green building item	
3. Delivery Methods	More discussion with students	add more example as per industry practice	
4. Assessment Methods	Upgrade student report with rubric	add log book for time frame.	

Fig. 3- 10. CQI report for CLO

More comprehensive CQI is also carried out in the class with students for every course. This is normally recorded in a faculty level form called CQI Report as presented in Fig. 3-11 which includes description of CQI activities, CQI topics and recommendations for improvement. CQI efforts in Integrated Design Project were done where external practicing engineers were invited to examine the students presenting their projects.



**UTHM**  
Universiti Teknikal Malaysia Melaka

**Continual Quality Improvement (CQI) Report**  
**Faculty of Civil and Environmental Engineering**

CQI Report (OBE Form)						
Programme :	Bachelor of Civil Engineering with Honours			Semester :	II	
Course Name :	Hydraulics			Session :	2014/2015	
Course Code :	BFC 21103			Section :	1, 2, 3, 5 & 6	
Coordinator :	Tan Lai Wai			Cohort :	BFF0405-8	

KPI	50% of students achieve 55% marks	Achieved	Not-achieved			
<b>CLO 1 (Cognitive)</b>	Explain the concept of uniform and non-uniform flows in open channel, hydraulic structure and machinery (C4, PLO1)					
Number of students that require CQI for Test 1 (score less than 55%)	88 (31.2%)	Attach "Laporan Keseluruhan Kursus" for <u>Test 1</u> (from TCIS) (Appendix 1)				
Number of students that require CQI for Test 2 (score less than 55%)	178 (63.1%)	Attach "Laporan Keseluruhan Kursus" for <u>Test 2</u> (from TCIS) (Appendix 1)				
CQI activities	Additional Class	Additional Exercise	Additional Notes	Different Delivery Approaches	Self-assessment	Other
Please tick (x)	-	x	x	x	x	x
Description on CQI activities	Students were given more exercises, additional notes (also in graphic & video formats to create interest), and also trial exams to help students improve their grasps of the learning outcomes.					
Description on topics where CQI has been conducted (Attach examples and pictures as proof)						
1) Careless mistakes in calculating open channel flow characteristics ( <b>Appendix 2</b> ). Students were always informed that if mistakes were done earlier in the calculations, the end results of analysis will be affected.						
2) Students have problems in derivation and mathematical equations. <b>Appendix 3</b> shows how WhatsApp and online learning management system AUTHOR are used in delivering lessons.						
3) Video and photos were used in learning and teaching of Hydraulics to relate students to the engineering practices ( <b>Appendix 4</b> ).						
4) Additional notes and exercises were conducted throughout the semester for Hydraulics. For every chapter, new exercise questions were discussed during the tutorial sessions ( <b>Appendix 5</b> ).						
Suggestion of improvement in the next semester:						
Current CQI activities can be maintained as comparison between Test 1, Test 2 and Final Examination results shows that CQI activities conducted have help student in improving their achievement in Final Examination. Variety of delivery approaches can be proposed ahead of next semester as to ensure students realize the importance of the learning outcomes and how they relate to the civil engineering practices. Apart from CQI activities on students, staff also attended variety of learning and teaching courses to enhance the skills ( <b>Appendix 6</b> ).						

Prepared by :  
*Tan Lai Wai*  
**Tan Lai Wai**

Date :  
**08 July 2015**

Fig. 3- 11. CQI report at faculty level

### 3.6 PLO Achievement for Individual Student via MyPLO

The achievement of PLO at student level for every individual has been developed and displayed through MyPLO. The detail achievement of an individual student is presented in Fig. 3-12.

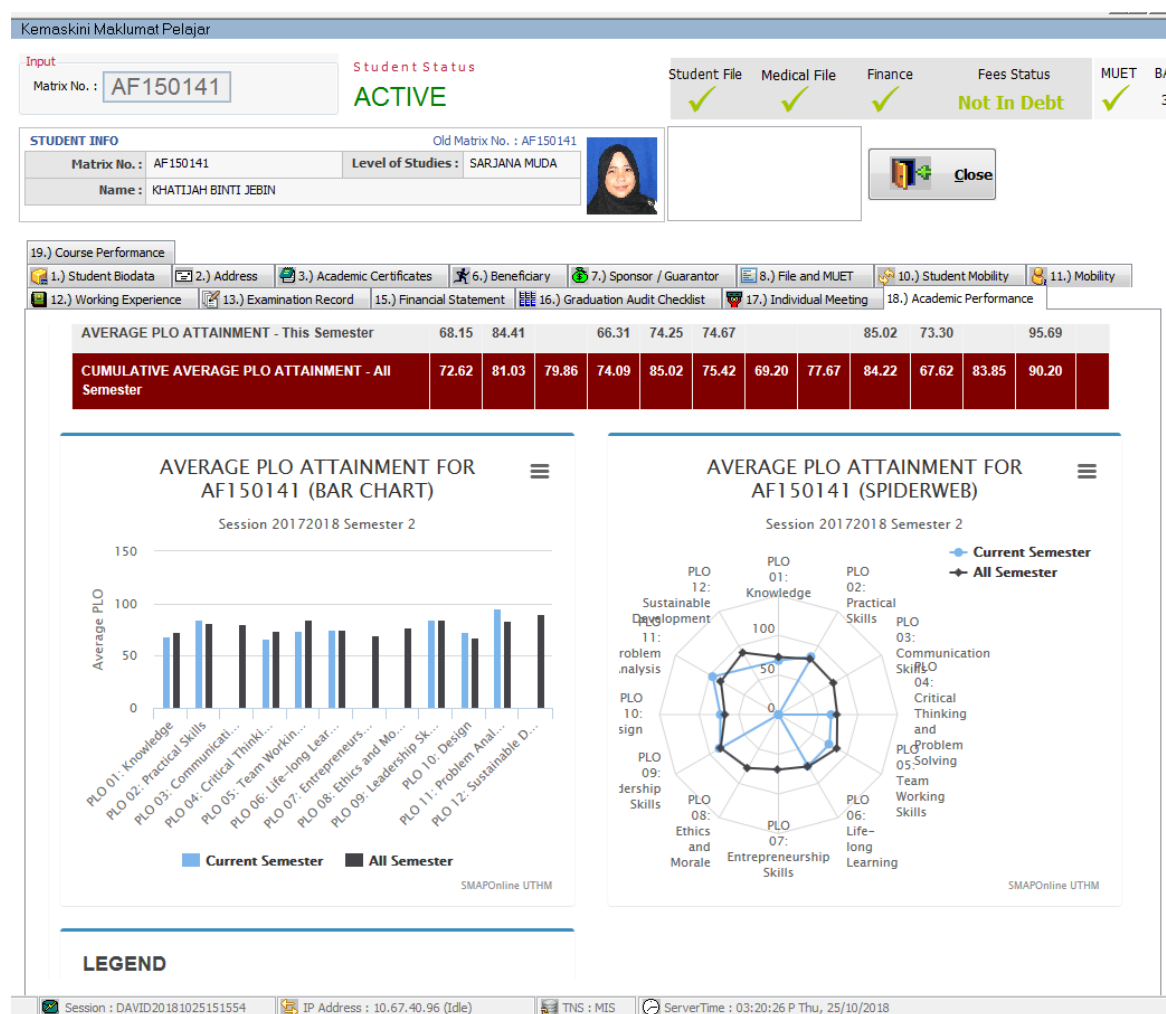


Fig. 3- 12. MyPLO summary achievement of individual student

### 3.7 Complex Engineering Problem in PLO

Complex Engineering Problem are defined as engineering problems that have some or all of the following characteristics: (1) involve wide ranging or conflicting technical or engineering issues; (2) have no obvious solution and require originality in analysis; (3) involve infrequently encountered issues; (4) are outside problems encompassed by standards and code of practice for professional engineering; (5) involve diverse group of

stakeholders with wide varying needs; (6) have significant consequences in a range of contexts; (7) cannot be resolved without an in-depth engineering knowledge .

Complex Engineering Problem (CEP) is mentioned in PLO 1, PLO 4, PLO 10 and PLO 11, all four PLOs being designated with Cognitive Domain as the primary domain type in FKAAB. Under CEP, accompanying attributes related to Complex problem solving (WP) and Complex engineering activities (EA) can be found within other different PLO. Such attributes are found across all courses offered and having different degree of complexity. However, for a start, 11 courses and all elective courses have been specially selected to showcase CEP components. This is given in Table 3-9. Each of these courses has been assigned to various CPS attributes. The CEP activities for every attribute are described in a form as shown in Fig. 3.15.

In 1<sup>st</sup> to 2<sup>nd</sup> September 2020, the CEP Workshop was conducted by CEP Committee to improve the knowledge and implementation of CEP in selected courses. The full report of CEP workshops as in Appendix 3.2.

Table 3- 9. Selected courses for CEP components

No	Course Code	Courses
1	BFC 23702	Creativity and Innovation
2	BFC 32703	Sustainable Construction Management
3	BFC 32102	Reinforced Concrete Design I
4	BFC 32803	Reinforced Concrete Design II
5	BFC 43003	Structural Steel and Timber Design
6	BFC 21502	Geomatic Practice
7	BFC 43103	Foundation Engineering
8	BFC 32403	Environmental Engineering
9	BFC 32904	Industrial Training
10	BFC 43303	Integrated Design Project
11	BFC 43402	Final Year Project I and II
12	BFX 4xxx3	Elective

**COMPLEX ENGINEERING PROBLEM (CEP) DESCRIPTIVE FORM FOR FKAAS**COURSE CODE: **BFC43003**COURSE NAME: **STRUCTURAL STEEL AND TIMBER DESIGN**

		PLO	LEVEL
CLO 1	Design the steel and timber structure elements according to BS EN 1993 and BS EN 1995.	10	C
CLO 2	Manipulate structural design processes to complete the assigned project.	9	P
CLO 3	Organize the design works report in group affectively which comprise of ideas and problem solving.	5	A

**COMPLEX PROBLEM SOLVING (CPS) MATRIX**

ATTRIBUTE	1	2	3	4	5	6	7	8	9
(tick)	/		/					/	/

CPS ATTRIBUTE	ASSESSMENT METHOD	TOPIC	CEP ACTIVITY DESCRIPTION
(1) Depth of knowledge required	Project	Beam, Column, Truss, Connection	Students are to perform the following activities: Layout planning, load distribution and analysis, design calculations, structural drawing and detailing. The project activities involve proposing a design for either a residential medium-rise, bus station or stadium grandstand. Wide ranging, indepth fundamental engineering knowledge are required.
(3) Depth of analysis required	Project	Beam, Column, Truss, Connection	In order to solve the given project, the students need to demonstrate and perform lengthy and in-depth analysis and calculations. Some analysis do not have obvious solutions for example in the design of long span truss frames. The students need to understand the fundamental concept of statics and mechanics before pursuing the analysis either by hand or using software.
(8) Consequences	Project	Beam, Column, Truss, Connection	A good design will be economical and easy to build. A poor design will be costly and hard to build. Detailing skills are also important.
(9) Judgment	Project	Beam, Column, Truss, Connection	The student will be assessed on their judgment especially in the layout planning activity. Good judgment brings about good decision making also in the load distribution and load combinations for the design works.

Fig. 3- 5. Complex Engineering Problem Form

### 3.8 Summary of PLO Attainment

With the three Assessment Methods for PLO described in Figure 3-1, in order to show that every PLO for BFF programme has been achieved, the overall average of all three assessments must be no less than 55%. This is the overall key performance indicator (KPI) set for PLO attainment. Table 3-7 present the summary PLO attainment for year 2019. The results conclude that PLO attainment ranges from lowest 64% (PLO 1 – K) to highest 82.14% (PLO 12 – ESus). All the PLO satisfies the PLO KPI of no less than 55%.

Table 3- 2. PLO attainment for 2020

PLO		CLO-PLO		CLO-PLO Achievement for 2020	Exit Survey	FCEE		FCEE Achievement for 2020	Ave. All	KPI $\geq$ 55%
		SEM 1	SEM 2			SEM 1	SEM 2			
1	K	63.9	73.2	68.6	84	55.1	61.3	59.3	70.63	PASS
2	PS	83.7	80.1	81.9	80				80.95	PASS
3	CS	83.1	79.8	81.4	81				81.20	PASS
4	CTPS	71.6	75.9	73.7	79	69.9	57.9	61.7	71.47	PASS
5	TW	81.3	82.8	82.1	86				84.05	PASS
6	LL	81.0	79.6	80.3	84				82.15	PASS
7	ES	79.2	79.2	79.2	83				81.10	PASS
8	ET	76.2	63.8	70.0	87				78.50	PASS
9	LS	82.5	83.5	83.0	84				83.50	PASS
10	DDS	62.8	73.5	68.2	81	43.3	77.5	66.4	71.87	PASS
11	PA	60.5	74.7	67.6	78	51.9	53.7	53.1	66.23	PASS
12	ESus	86.5	83.0	84.8	82				83.40	PASS
13	ESoc	85.8	87.0	86.4	82				84.20	PASS

## 4 REPORT CONCLUSION

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This report provides the evidences of OBE implementation and the measurement both direct and indirect to demonstrate the attainment of FKAAB PLO for year 2020.

Prior to Semester 1 Session 2020/2021 (October 2020), The number of PLOs were reduced from 13 to 12 PLO as shown in Table 4.1. The number of PLOs was reduced from 13 to 12 where the PLO on entrepreneurship skill is merged with PLO Project Management and Finance. The changes made follow the recommendation given by the Centre for Academic Development and Training (CAD) and were approved by the Senate of UTHM. Therefore, OBE Report 2020 was the last analysis using 13 PLO and next analysis of will follow the new 12 PLO as stated in Table 4.1.

Table 4-1. The Programme Learning Outcomes (PLO) of Bachelor of Civil Engineering with Honours (EAC Manual 2020)

PLO	Key Idea	Description OF Learning Outcomes
1.	Engineering Knowledge (K)	Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation as specified in WK1 to WK4 respectively to the solution of complex civil engineering problems. Primary Domain: COGNITIVE PLO 1 in EAC Standard 2020
2.	Problem Analysis (PA)	Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4). Primary Domain: COGNITIVE PLO 2 in EAC Standard 2020
3.	Design / Development of Solutions (DDS)	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (WK5). Primary Domain: COGNITIVE

		PLO 3 in EAC Standard 2020
4.	Investigation (INV)	Conduct investigation of complex engineering problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions. Primary Domain: COGNITIVE PLO 4 in EAC Standard 2020
5.	Modern Tool Usage (MTU)	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6). Primary Domain: PSYCHOMOTOR PLO 5 in EAC Standard 2020
6.	The Engineer and Society (ESoc)	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (WK7). Primary Domain: AFFECTIVE PLO 6 in EAC Standard 2020
7.	Environment and Sustainability (ESus)	Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts (WK7). Primary Domain: AFFECTIVE PLO 7 in EAC Standard 2020
8.	Ethics (ET)	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7). Primary Domain: AFFECTIVE PLO 8 in EAC Standard 2020
9.	Individual and Team Work (TW)	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings. Primary Domain: AFFECTIVE PLO 9 in EAC Standard 2020
10.	Communication Skills (CS)	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design

		documentation, make effective presentations, and give and receive clear instructions. Primary Domain: PSYCHOMOTOR PLO 10 in EAC Standard 2020
11.	Project Management and Finance (PMF)	Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments. Primary Domain: PSYCHOMOTOR PLO 11 in EAC Standard 2020
12.	Life Long Learning (LLL)	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Primary Domain: AFFECTIVE PLO 12 in EAC Standard 2020

## Appendix 2-1 PEO Employer Survey

Version 2016



### PROGRAMME EDUCATIONAL OBJECTIVES (PEO) EMPLOYER SURVEY

#### EMPLOYER DETAILS

1. Name :
2. Email :
3. Contact Number :
4. Company Address :
5. I am a : ☐ Consultant  
☐ Contractor  
☐ Developer  
☐ Manufacturer  
☐ Government Agency  
☐ Others : \_\_\_\_\_
6. Date Of This Survey :

#### ALUMNI STATISTICS

Total number of UTHM Alumni you are employing

	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person	7 Person	8 Person	9 Person
Graduated 3 to 5 years ago									

If more than 9 persons please state : \_\_\_\_\_

**GRADUATE RATING (graduated 3 to 5 years ago)**  
*Kindly rate UTHM graduates*

Please rate the strength of UTHM alumni.

		<b>Fail</b>	<b>Poor</b>	<b>Average</b>	<b>Good</b>	<b>Excellent</b>
1.	Knowledgeable in Engineering, Mathematics & Science	1	2	3	4	5
2.	Technically competent	1	2	3	4	5
3.	Have a sense of number and dimensions	1	2	3	4	5
4.	Proficient in spoken English	1	2	3	4	5
5.	Proficient in written English	1	2	3	4	5
6.	Able to prepare and deliver presentation	1	2	3	4	5
7.	Able to prepare report containing words and drawings	1	2	3	4	5
8.	Able to lead a given task or project	1	2	3	4	5
9.	Able to work with others in a team	1	2	3	4	5
10.	Able to solve problems related to work	1	2	3	4	5
11.	Willing to share ideas	1	2	3	4	5
12.	Willing to do things in the right way	1	2	3	4	5
13.	Willing and able to follow instruction	1	2	3	4	5
14.	Show concerns for safety, quality and environmental protection	1	2	3	4	5
15.	Have basic interpersonal skills	1	2	3	4	5
16.	Bold and courageous to explore new ideas	1	2	3	4	5
17.	Often ready to initiate ideas	1	2	3	4	5
18.	Enthusiastic and productive at work	1	2	3	4	5
19.	Willing to learn and improve technical abilities	1	2	3	4	5
20.	Able to understand and meet expectations of customers	1	2	3	4	5

**THANK YOU**

## Appendix 2-2 PEO Alumni Survey

Version 2016



### PROGRAMME EDUCATIONAL OBJECTIVES (PEO) ALUMNI SURVEY

#### PART 1 : PERSONAL DETAILS

1. Name :
2. Email :
3. Contact Number :
4. Year Graduate Degree Programme :
5. Position :
6. Company Address :

#### PART 2: PROGRAMME EDUCATIONAL OBJECTIVES

Please rate on a scale of 1 (Very Poor) to 5 (Excellent) how well has each of these PEO been achieved in you from the day you graduated until now

		Very Poor	Poor	Average	Good	Excellent
PEO	Knowledgeable and technically competent in					
1	civil engineering discipline in-line with the industry requirement.	1	2	3	4	5
PEO	Effective in communication and demonstrate					
2	good leadership quality in an organization	1	2	3	4	5
PEO	Capable to solve civil engineering problems					
3	innovatively, creatively and ethically through sustainable approach	1	2	3	4	5
PEO	Able to demonstrate entrepreneurship skills					
4	and recognize the need of life-long learning for successful career advancement	1	2	3	4	5

### **PART 3: TRACER STUDY FOR ALUMNI**

#### ***Programme Educational Objectives (PEO) FKAAS***

Please tick in the box below.

- |     |   |                              |                             |
|-----|---|------------------------------|-----------------------------|
| 1.  | Have been promoted or offered to a better position                                      | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2.  | Have been involved in research/construction project proposal either as member or leader | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3.  | I am a Professional Engineer (PE)   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4.  | Have published papers in conference/journal   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5.  | Have held leadership positions for a taskforce or project within an organization        | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6.  | Have been involved in civil engineering design/construction projects                    | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 7.  | Have been involved in research and/or development projects related to civil engineering | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 8.  | Have been attending Continuous Professional Development courses.                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 9.  | Have furthered studies to a higher degree   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 10. | Have ventured into business (self-owned or partnership)                                 | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

**THANK YOU**

## Appendix 3-1 PLO Exit Survey



### EXIT SURVEY PROGRAM LEARNING OUTCOME (PLO) FKAAS

Please rate (tick in the box below) on a scale of 1 (POOR) to 5 (EXCELLENT) how well has each of the 13 PLO been achieved in you.

#### PART 1: PERSONAL DETAILS

1. Name :
2. Matric Number :
3. Gender :
4. Working Status : ☐ Further Study Master or PhD  
☐ Not Employed  
☐ Employed (Civil Engineering)  
☐ Employed (Not Civil Engineering)

#### PART 2: PROGRAM LEARNING OUTCOME (PLO)

Please rate (tick in the box below) on a scale of 1 (Fail) to 5 (Excellent) how well has UTHM graduates fulfil these PLO

		Fail	Poor	Average	Good	Excellent
1.	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex civil engineering problems.	1	2	3	4	5
2.	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex civil engineering activities, with an understanding of the limitations.	1	2	3	4	5
3.	Communicate effectively on complex civil engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	1	2	3	4	5
4.	Conduct investigation into complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	1	2	3	4	5
5.	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.	1	2	3	4	5

6.	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	1	2	3	4	5
7.	Self-motivate and enhance entrepreneurship skills for career development.	1	2	3	4	5
8.	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	1	2	3	4	5
9.	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	1	2	3	4	5
10.	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	1	2	3	4	5
11.	Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.	1	2	3	4	5
12.	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.	1	2	3	4	5
13.	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.	1	2	3	4	5

### PART 3: VERIFICATION

E-mail : \_\_\_\_\_

**THANK YOU**