

Continuous Improvement Report

**For the
Civil Engineering Program**

**At
Faculty of Engineering
Najran University
Najran – Saudi Arabia
2016**

CONFIDENTIAL

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1. INTRODUCTION

Program History

The Civil Engineering Program was established in 2007 and has been in operation ever since. It was mainly a male program. Courses in Civil Engineering were offered at Najran University through the Faculty of Engineering and produced its first graduates in 2012/2013. The Faculty of Engineering is bringing together programs in civil, and electrical engineering. The language of instruction at Civil Engineering program – Najran University is English. The students in the CE Program will gain proficiency in some of the recognized major Civil Engineering areas. These engineering areas include (1) Geotechnical Engineering, (2) Water Resources and Environmental Engineering, (3) Transportation and Highway Engineering, (4) Structural Engineering in addition to basic project management techniques.

Mission Statement

The mission statement of Civil Engineering Program is given below and it is published on the Faculty website <http://portal.nu.edu.sa/en/web/engineering-college/civil/vision-mission>

Mission of Civil Engineering Program	<p>Civil engineering program is committed to:</p> <ul style="list-style-type: none">• Provide students with an accredited civil engineering education of high-quality standards• Generate graduate possesses excellent knowledge and strong competent skills and upholds professional attitudes necessary in fulfilling his responsibilities towards almighty and society and meet the industry's expectations.• Conduct high quality applied civil engineering research using the best modern technology.• Provide innovative solutions to civil engineering problems which contribute to the sustainable development.• Build knowledge society nationally and internationally
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The mission of Civil Engineering Program can be divided into five key components (KC) as shown in Figure 2-3.



Figure 2-3. Analysis of the mission of Civil Engineering Program into five key components

Program Educational Objectives

The Civil engineering department has defined a set of PEOs that translate its mission into definite abilities they attain a few years after graduation. The PEOs of the civil engineering program are defined as shown in Table 2-6 below.

Table 2-6. Program Educational Objectives (PEO) of civil engineering program

Code	Program Educational Objectives (PEO), Graduates of the civil engineering program are expected within a few years of graduation to have demonstrated their ability to:
PEO1	Technically competent in their respective civil engineering field and conceiving, designing and executing broad range of civil engineering tasks locally and globally
PEO2	Meet industry expectations in civil engineering with excellent communication and leadership skills
PEO3	Contribute to the society through providing innovative solution for civil engineering problems and function on multi-disciplinary team
PEO4	Pursue their civil engineering professional development through self-learning and advanced graduate studies if qualified and interested.
PEO5	Uphold professional and social ethics necessary in fulfilling his responsibilities towards the Almighty, clients, and the society and contribute to the sustainable development of the kingdom

The program educational objectives can be found by the general public on the website of civil engineering department using this link:

<http://portal.nu.edu.sa/en/web/engineering-college/civil/objectives>

Program Outcomes

The Civil Engineering Department has adopted the Student Outcomes a-k as prescribed in ABET Criterion 3. These abilities that students must demonstrate at the time of graduation are attained through various courses taken by all students during the program. However, performance measures have been specified for all SOs to make them measurable and relevant to the program. These performance measures will be presented in Criterion 4. Student Outcomes a-k are listed in Table 3.1. These have been published at the following URL:

<http://portal.nu.edu.sa/en/web/engineering-college/civil/outcomes>

Table 3.1 Student Outcomes a-k

Code	ABET	Student/Program Outcome (SO) of civil engineering program Student at the end of civil engineering program should be able to:
SO1	3a	Identify and apply knowledge of mathematics, sciences, and engineering in civil engineering problems
SO2	3b	Design and conduct experiments, as well as to analyze and interpret data required for solving civil engineering projects.
SO3	3c	Design optimum system/component of civil engineering facilities/infrastructures to meet desired needs using realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
SO4	3d	Function effectively in multi-disciplinary construction project/civil engineering teams.
SO5	3e	Identify, formulate, and solve civil engineering problems and to evaluate and synthesize information in order to provide best alternative solutions.
SO6	3f	Act professionally and ethically and recognize the impact of liability issues in civil engineering projects and constructions.
SO7	3g	Communicate effectively prepare professional written materials, graphical communications and deliver professional oral and written presentations.
SO8	3h	Recognize the broad education necessary to understand the impact of engineering solutions to economic, environmental and society and to improving the quality of life.
SO9	3i	Recognize the need for life-long learning and to engage in continuing education of professional/engineering skills.
SO10	3j	Recognize the knowledge of contemporary issues in planning, designing, constructing, and rehabilitating civil engineering infrastructures.
SO11	3k	Develop and use techniques and skills using modern engineering methods and tools needed in civil engineering practices.

2. CURRICULUM

All student graduated from civil engineering program will receive a Bachelor of Civil Engineering. Head of the Civil Engineering Department and the Deanship of Admissions and Registration are jointly responsible for ensuring that all graduating students have met all the graduation requirements. With the help of the online registration system, the Deanship of Admissions and Registration ensures that graduating students are fulfilling all the requirements for graduation.

Deanship of Admissions and Registration ensures that graduating students from civil engineering program has completed 27 credit hours in the PYP presented in previous section A (admission requirement).

The graduation requirement for the graduation from the Bachelor of Civil Engineering Program required completing the Civil engineering curriculum which consists of 132 credit hours in addition to PYP curriculum of 27 credit hours as admission requirements. According to the University regulations, the student cumulative average should be 2.0 out of 5.0 or better at the time of graduation. The requirement of 132 credit hours for civil engineering program in addition to 27 credits for the preparatory year program is distributed amongst various components. .

Table 1-6. Distribution of Civil Engineering Curriculum

PYP curriculum of 27 credit hour			
No.	Curriculum Component	No. of Courses	No. of Credit Hours
1.	English courses	5	11
2.	Math and Science	2	6
3.	Communication Skills	3	6
4.	Computer skills	1	2
5.	Occupational Ethics	1	2
Sub Total		12	27
Civil engineering curriculum 132 credit hours			
No.	Curriculum Component	No. of Courses	No. of Credit Hours
1.	University Requirement Courses	6	12
2.	Faculty Requirements	General Requirements	5
		Math and Science	29
		General Engineering	18
3.	Department Requirements	24	68
4.	Cooperative Field Training	1	0
Sub Total		49	132
Grand Total		61	159

The details of all courses offered in civil engineering program curriculum components are shown in Table 1-7. A flowchart that illustrates the prerequisite structure of the civil engineering program's required courses is shown in Figure 5-2.

Table 1-7. Civil Engineering Curriculum Components

Prep. Year			
No.	Course Code	Course Title	Credit Hours CR (Theory, Lab, Tut.)
1.	140TEC-3	Computer Skills	3 (3 , 0 , 0)
2.	140MATH-2	Introduction of Mathematics	2 (2 , 0 , 0)
3.	140SKL-2	Learning, Thinking and Research Skills	2 (2 , 0 , 0)
4.	140ENGG-2	English Language :Reading Skills	2 (2 , 0 , 0)
5.	141ENGG-2	English Language :Writing Skills	2 (2 , 0 , 0)
6.	142ENGG-2	English Language :Listening and Speaking Skills	2 (2 , 0 , 0)
7.	143ENGG-2	English Language :Grammars	2 (2 , 0 , 0)
8.	150MAN-1	Occupational Ethics	1 (1 , 0 , 0)
9.	150MATH-4	Algebraic Sciences	4 (4 , 0 , 0)
10.	150SKL-2	Communication Skills	2 (2 , 0 , 0)
11.	150ENGG-3	English Language: Speaking	3 (3 , 0 , 0)
12.	151ENGG-2	Report Writing	2 (2 , 0 , 0)
Total			27(27 , 0 , 0)
University Requirements			
No.	Course Code	Course Title	Credit Hours CR(Theory,Lab,Tut.)
1.	111ISL-2	Introduction to Islamic Culture 1	2 (2 , 0 , 0)
2.	112ISL-2	Introduction to Islamic Culture 2	2 (2 , 0 , 0)
3.	201ARAB-2	Arabic Language Skills	2 (2 , 0 , 0)
4.	113ISL-2	Islamic Culture (3)	2 (2 , 0 , 0)
5.	202ARAB-2	Arabic Writing	2 (2 , 0 , 0)
6.	114ISL-2	Islamic Culture (4)	2 (2 , 0 , 0)
Total			12(12 , 0 , 0)
Faculty Requirements			
Faculty Requirements			
No.	Course Code	Course Title	Credit Hours CR(Theory,Lab,Tut.)
1.	107ENG-3	Technical Writing	3 (3 , 0 , 1)
2.	108ENG-2	Communication Skills for Engineers	2 (2 , 0 , 1)
Sub Total			5 (5 , 0 , 2)
Math and Science			
No.	Course Code	Course Title	Credit Hours CR(Theory,Lab,Tut.)
1.	101CHM-3	General Chemistry	3 (3 , 0 , 1)
2.	104PHIS-4	Principles of Physics	4 (3 , 2 , 1)
3.	106MATH-3	Introduction to Integration	3 (3 , 0 , 1)
4.	107MATH-3	Algebra & Analytical Geometry	3 (3 , 0 , 1)
5.	203MATH-3	Advanced Calculus	3 (3 , 0 , 1)
6.	105PHIS-4	Advanced Physics	4 (3 , 2 , 1)
7.	204MATH-3	Differential Equations	3 (3 , 0 , 1)

8.	324STAT-3	Probabilities and Engineering Statistics	3 (3 , 0 , 1)
9.	254MATH-3	Numerical Methods	3 (3 , 0 , 1)
	Sub Total		29 (27 , 4 , 9)
General Engineering			
No.	Course Code	Course Title	Credit Hours CR(Theory,Lab,Tut.)
1.	101GE-3	Statics	3 (3 , 0 , 1)
2.	102GE-2	Introduction to Engineering Design	2 (2 , 0 , 1)
3.	203GE-3	Engineering Drawing	3 (1 , 4 , 1)
4.	205GE-3	Dynamics	3 (3 , 0 , 1)
5.	306GE-2	Engineering Economy	2 (2 , 0 , 1)
6.	407GE-2	Management of Engineering Projects	2 (2 , 0 , 1)
7.	204GE-3	Computer Programming for Engineers	3 (2 , 2 , 1)
	Sub Total		18 (15 , 6 , 7)
	Grand Total		52 (47 , 10 , 18)
Department Requirements (Core Course)			
No.	Course Code	Course Title	Credit Hours CR(Theory,Lab,T ut.)
1.	241CE-3	Strength of Materials	3 (3 , 0 , 1)
2.	261CE-3	Surveying (1)	3 (2 , 2 , 1)
3.	221CE-3	Soil Mechanics (1)	3 (2 , 2 , 1)
4.	211CE-3	Fluid Mechanics	3 (2 , 2 , 1)
5.	251CE-3	Structural Analysis (1)	3 (3 , 0 , 1)
6.	312CE-3	Hydraulics	3 (2 , 2 , 1)
7.	352CE-3	Reinforced Concrete (1)	3 (3 , 0 , 1)
8.	342CE-3	Properties and Testing of Materials	3 (2 , 2 , 1)
9.	353CE-3	Structural Analysis (2)	3 (3 , 0 , 1)
10.	313CE-3	Hydrology	3 (2 , 2 , 1)
11.	371CE-3	Sanitary Engineering	3 (2 , 2 , 1)
12.	354CE-3	Reinforced Concrete (2)	3 (3 , 0 , 1)
13.	381CE-2	Computer Applications in Civil Engineering	2 (1 , 2 , 1)
14.	355CE-3	Steel Structures	3 (3 , 0 , 1)
15.	322CE-3	Soil Mechanics (2)	3 (2 , 2 , 1)
16.	462CE-3	Surveying (2)	3 (2 , 2 , 1)
17.	431CE-3	Highway Engineering	3 (2 , 2 , 1)
18.	423CE-3	Foundation Engineering	3 (3 , 0 , 1)
19.	491CE-2	Graduation Project (1)	2 (2 , 0 , 1)
20.	414CE-3	Water Resources Planning and Management	3 (3 , 0 , 1)
21.	432CE-3	Transportation and Traffic Engineering	3 (3 , 0 , 1)
22.	472CE-3	Environmental Engineering	3 (2 , 2 , 1)
23.	433CE-2	Construction Equipment and Methods	2 (2 , 0 , 1)
24.	492CE-2	Graduation Project (2)	2 (2 , 0 , 1)
24	Sub Total		68 (56 , 24 , 24)
25	391CE-0	Cooperation Field Training	0 (0 , 0 , 0)

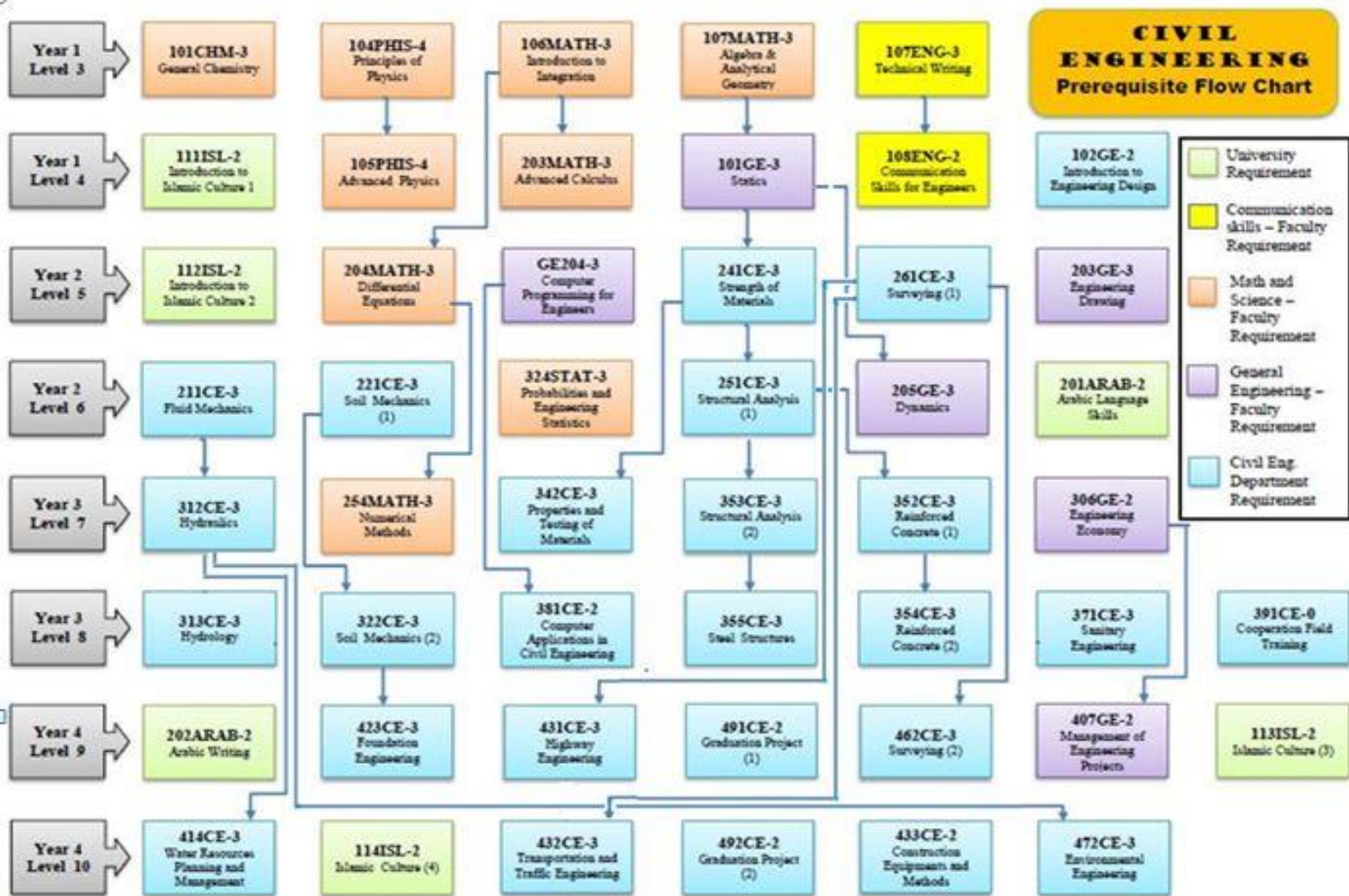


Figure 5-2: Prerequisites Flowchart for Civil Engineering Program

3. PROGRAM CONSTITUENCIES

The success of the civil engineering graduates is an integral part of the success of the Civil Engineering Program and department. However, in order to produce successful civil engineering graduates, the Civil Engineering Program must be sensitive to the needs of civil engineering industry and other potential employers. The Civil Engineering Program has in place a continuous improvement process that always seeks the participation and input from the following constituencies:

1. Students
2. Alumni
3. Employers
4. Faculty
5. Civil Engineering Industrial Advisory Council (CE-IAC)
6. Government and National Professional Engineering Societies
7. International Engineering Professional and Societies

Students

Students are the product of the program. The knowledge and skills gained by the students enrolled in the program represent the product of the learning experience. It is the responsibility of the program to prepare and guide the students to maximize their potential and to contribute to the likelihood of securing a suitable job and the longer-term issue of developing a career. Students are best able to provide feedback while with the program on a course-by-course basis and when close to graduation by reflecting on the way in which the educational components have supported learning in a broader sense. POE's help prospective students in their decision to pursue the degree for a possible career in Civil Engineering.

Alumni

Students especially after few years their graduation (3-5 years) are likely to gain additional perspectives on the Civil Engineering Program and even some of the specific course work. The alumni see the value of their degrees not only in terms of their own skills but also the future reputation of the department. Their view is one that incorporates the experience of matriculating in the program as well as practicing the profession. The alumni are, therefore, critical to providing general feedback about the program and the curriculum, and to viewing the program in terms of how it has supported their career growth. They represent a mirror in which the current students can see their future image.

Employers

Employers are essential in providing inputs to the program. The program improvement is strongly influenced by their needs and opinion. Their satisfaction reflects a positive image of our alumni, affects the reputation of the program, and places our graduates at a competitive advantage in the job market. The input of employers is obtained through their participation in the

Civil Engineering Advisory Council. This committee meets once a year where it reviews and provides input for the curriculum and approves any improvement of the Program Educational Objectives. POE's provides guidance to employers for determining if the graduates from the program will be the best fit for employment in their business or industry.

Faculty Staff

Faculty staff consists of members of the departmental teaching staff who are responsible for meeting the program outcomes and objectives during the teaching process.

Civil Engineering Industrial Advisory Council (CE-IAC)

CE-IAC is composed of members of industrial experience in the Civil Engineering sectors of Saudi Arabia. These members not only understand the needs of potential employers of our students, but they are also interested in career and academic issues associated with Civil engineering education in general. The council meets at least once a year. The input from CE-IAC has been primarily in the form of critiques/advice on issues related to the learning atmosphere, cooperation with the industry, as well as the research activities of the department. Meeting with the council usually concentrated on more systematic reflection on program educational objectives, program learning outcomes, and other accreditation-related activities. POE's provides guidance to CE-IAC for determining if the graduates from the program will be adequately prepared for the career in Civil Engineering area. Figures 2-4(a) and 2-4(b) show the first and second meetings of CE-IAC for the academic years 2013/2014 and 2015/2016 respectively.



Figure 2-4 (a): CE-IAC meeting 2013-2014.



Figure 2-4 (b): CE-IAC meeting 2015-2016.

Government and National Professional Engineering Societies

National and international professional engineering organizations were considered in designing the curriculum of the civil engineering program. The program made to meet the needs and requirements of this organization. Ministry of higher education, Saudi Engineering Council is the most important organization under this category. Several requirements set by Ministry of Higher Education (MOHE) and National Commission for Academic Accreditation & Assessment (NCAAA) were maintained in designing civil engineering program. Samples of important documents such as National Qualifications Framework and Standards for Quality Assurance and Accreditation of Higher Education Programs are shown in Figure 2-5.

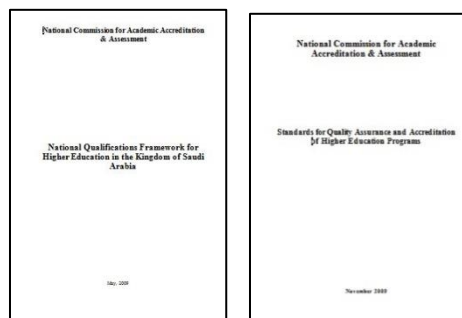


Figure 2-5. Useful reference documents from ASCE and ABET.

International Engineering Professional and Societies

Input from several international organization related to civil engineering education is considered. ABET and ASCE are the most important organization in this category. In designing the civil engineering program and forming the PEO and SO, requirements of ABET and ASCE were considered and several useful documents were used as referenced such as the vision of engineering 2025, BOK2 and ABET criteria. Samples of these Documents are shown in Figure 2-6.

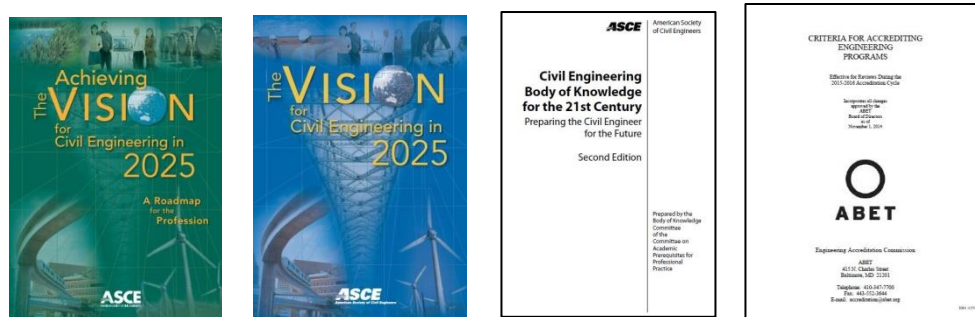


Figure 2-6. Useful reference documents from ASCE and ABET.

4. ASSESSMENT PROCESS

In this chapter, processes for regularly assessing and evaluating the extent to which the student outcomes attained are presented. The level of which the student outcomes attained also explained in this chapter. This chapter also describes how the results of these processes are utilized to affect the continuous improvement of the program. This chapter also describes how the results of evaluation processes for the student outcomes and any other available information have been systematically used as input in the continuous improvement of the program. A rationale improvements and changes also provided. Information such as samples of the assessment results evaluated and where recommendations for action made also included in this chapter.

Description of Assessment Processes

In this section, we present a complete discussion of the assessment of student's outcomes. Through the use of tables and figures, we describe the evaluation process and how it is documented and maintained. Each of the following sub-sections based on the recommended format from the ABET guide. Several processes have implemented for regularly assessing and evaluating the student outcomes (SOs). This section of the chapter provides a detail description of all assessment processes. Figure 4.1 below summarizes the assessment processes of the SOs.

Figure 4.1 indicates that the assessment methods and processes of civil engineering program student outcomes (SOs) divided into two broad types of assessments called direct assessments and indirect assessment. Direct assessment processes consist of two methods. The first method of assessment of SOs implicit from the course learning outcomes of all courses in the civil engineering curriculum. In the second method, the assessment of SOs is done using final graduation project. Indirect methods consist of five methods. Indirect methods collect the feedback of all civil engineering program constituents such as students, graduates, faculties, alumni, and employee. All these methods used a questionnaire of five-level scale.

Assessment methods explained in Figure 4.1 showed that feedback from the civil engineering industrial advisory council and civil engineering external examiner incorporated to the assessment methods. These types of assessment constructed at the end of each year through a meeting and review of SOs with the program chair and staff of civil engineering program. The curriculum committee examine and consider the issues stated in the report of external examiners and minute of the meeting of the industrial advisory council. An action plan for continuous improvement then proposed to civil engineering program council.

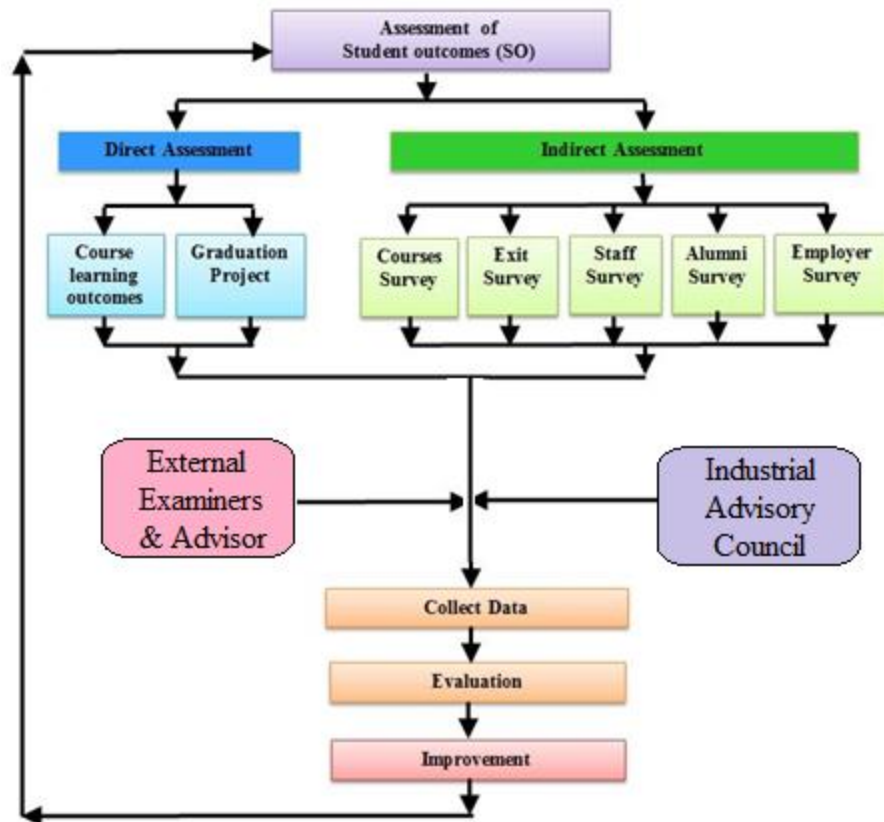


Figure 4.1 SO Assessment Plan

Direct Assessment

Direct assessment process of SOs is the most important part of the assessment plan. This process includes formative assessment method and summative assessment method. Formative method called course learning outcomes which include the assessment of SOs implicit from CLOs of all courses in the civil engineering curriculum. Summative method called final graduating project. Detail descriptions of these two direct assessment methods are explained in the following sections.

Course Learning Outcomes (CLOs)

A formative assessment method of SOs carried out using implicit from assessments course learning outcomes (CLOs) For each course. The instructor collects course assessment data in a prescribed format. The data for each core course are input to the CLOSO software by the instructor during last two years. Before two years the instructors used an excel template. CLOSO software produces all the required analyses and evaluation data. It also produces a print out of the complete course file for quality and accreditation purpose. The results are finally reviewed and evaluated by the CLOSO Admin part of the software. The compiled results are discussed and assessed by the Curriculum Committee and Assessment and Evaluation

- i) Graduation Project 1 (491CE-2): For this two credit hours is allotted to the students per week and they must prepare a feasible project proposal. The pre-requisite for this is to complete 90 credit hours from the civil engineering curriculum.
- ii) Graduation Project 1 (492CE-2):: For this two credit hours is allotted to the students per week and in the end, a final report have to be submitted to the department on the given date and a presentation to an examination panel should be performed by each student. Students have 491CE-2 as a pre-requisite for this course. Students must prepare the project report by the guidelines provided by the civil engineering department.

CLOs of Graduation Project

Assessment data for the graduation project submitted by the graduation project supervisors and examination panel are based on a set of CLOs that are pre-specified and are strongly linked to the SOs for both project 1 and 2. The prescribed CLOs are shown in Table 4.1.

Table 4.1 Graduation Project CLOs for both projects 1 and 2.

CLO ID	CLO
1	Identify, formulate and solve the analytical and numerical problems associated with the project
2	Design a system, component or process with defined constraints of the project
3	Plan, design and conduct the laboratory or numerical experiments required for the project and to analyze and interpret the data
4	Describe the economic and environmental impact and contemporary issues of the project ² and various alternative solutions
5	Function as a member of a multi-disciplinary team
6	Identify the codes and local laws regulating various aspects of the project and apply the codes wherever possible
7	Identify and analyze a situation involving professional ethics and to make a decision
8	Prepare an engineering report of the project and present it demonstrating engineering communication skills
9	Collect data and information required to complete the project from Library and Internet resources

Mapping of CLOs and SOs for Graduation Project

For both courses of graduation project, a mapping of CLOs with the student outcomes of a civil engineering program (SOs) are established as shown in Table 4.2. It can be observed from the CLO-SO map that all the 11 SOs from (a) to (k) are significant in the GP. Therefore over the two semesters, the students demonstrate their abilities in all the required SOs through the tasks required by the GP. Since graduation project is taken by the students when they are close to the

graduation, the data obtained from the GP is the most reliable data indicating the attainment of the SOs.

Table 4.2 Mapping of Graduation Project CLOs with SOs

Mapping Student outcomes with course outcomes:											
Student outcomes Course Learning Outcomes	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	SO9	SO10	SO11
	a	b	c	d	e	f	g	h	i	j	k
CO1	1				1						1
CO2			1			1					1
CO3		1									1
CO4								1		1	
CO5				1							
CO6						1					
CO7						1					
CO8							1				1
CO9									1		1

Indirect Assessment

Indirect assessment methods are another important assessment methods cover the input from all program constituencies through a questionnaire. Indirect assessments include assessment of students outcomes based on opinions of civil engineering students, expected graduates, faculty of civil engineering program, alumni, and employees. The following section explains in details each of these indirect assessments.

Course Survey

Indirect assessment of SOs attainment through course-wise student survey is a very important indirect assessment. Students get a chance to tell about their perception concerning the attainment of the CLOs. For each course, CLOSO software produces a CLO satisfaction survey form. The instructor distributes the survey form to the students at the end of the semester before the final examination. The students fill in the survey form to tell their opinion about how well they think they have learned based on their perception. The data is entered in the CLOSO software by the instructor. The software does the rest of the processing and determines the results including the results from all courses using the mapping of CLOs and SOs.

Exit Survey

The exit survey is conducted just before the final examinations of each semester. All graduating students fill in a survey form. In this survey the graduating students give their assessments of

how well they have attained the SOs. The data is compiled by the Exit Interview Committee and is reviewed by the Assessment and Evaluation Committee.

Faculty Survey

Indirect Faculty Survey for the program performed in two ways. The first survey performed through courses learning outcomes and using CLOSO software SOs results by integrated the results of all courses in the program. The second method each staff in civil engineering program filled a questionnaire to give their opinion on the level of student attainment of the graduate students.

Alumni Survey

The Alumni Survey is performed yearly and evaluated at an interval of three years. The survey has other purposes, but one of the objectives is to obtain the opinion of the alumni about how they found themselves in the abilities relevant to the SOs at the time of graduation. A sample of Alumni Survey questionnaire is presented in Figure 4.26 below.

Employee Survey


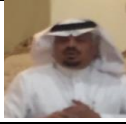

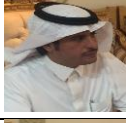
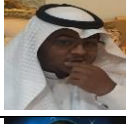




The Employer Survey is performed yearly and evaluated at an interval of three years. There are several items on the questionnaire. One major purpose of the survey is to determine the opinions of the employers about the abilities of the graduates of the Civil Engineering Program related to each SO at the time they were hired after graduation. A sample of Employer Survey questionnaire is presented in Figure 4.27 below.

Industrial Advisory Council (IAC)

The input from Civil Engineering Industrial Advisory Council (CE-IAC) has been primarily in the form of critiques/advice on issues related to the learning atmosphere, cooperation with the industry, as well as the research activities of the department. Meeting with the council usually concentrated on more systematic reflection on program educational objectives, program learning outcomes, and other accreditation-related activities. Below is the list of the current CE-IAC and the second meeting of the council on 14 June 2016 (see Table 4.5).

Table 4.5: Civil Engineering Industrial Advisory Council, 14 June 2016



		
No.	Industrial Advisory Council	photo

1.	Associate Professor Dr. Abdullah Alwadie Dean, College of Engineering Najran University, Najran, Saudi Arabia Tel: 00966 507776986 Email: asalwadie@nu.edu.sa	
2.	Engineer Hassan Salem Al Juraib General Manager University Project department, Najran, Saudi Arabia Tel: 00966 556663166 Email: hasgr999@hotmail.com	
3.	Engineer Ahmad H. Alsaqir Alshahrani Najran District Director STC, Najran, Saudi Arabia Tel: 00966 553282800 Email: ahsager@hotmail.com	
4.	Engineer Erfan Hatem Al Mansoor Assistant Manager University Project department, Najran, Saudi Arabia Tel: 00966 544196000 Email: ehalmansoor@hotmail.com	
5.	Engineer Raid Faisal alghadam Civil and Safety Engineer University Project department, Najran, Saudi Arabia Tel: 00966 543311138 Email: ralghadam@hotmail.com	
6.	Associate Professor Abdulnoor A.J Ghanim Civil Engineering Department College of Engineering, 11001 Najran, Saudi Arabia Tel: 00966 545529898 Email: aaghanim@nu.edu.sa	
7.	Assist. Prof. Dr. Ibrahim Hakeem Civil Engineering Department College of Engineering, 11001 Najran, Saudi Arabia Tel: 00966 569584746 Email: iyhakeem@nu.edu.sa	
8.	Assoc. Prof. Dr. Hashem Al-Mattarneh Civil Engineering Department College of Engineering, 11001 Najran, Saudi Arabia Tel: 00966 565 212 007 Email: hmalmattarneh@nu.edu.sa	
9.	Dr. Saleh Hamel Al-Salem Civil Engineering Department College of Engineering, 11001 Najran, Saudi Arabia Tel: 00966 555 72 4545 Email: dr.saleh.uk@gmail.com	

External Examiner & Advisor

Civil engineering program selected two professors in civil engineering from University Technology PETRONAS, Malaysia to be an external examiner and advisors for the program. A yearly review is conducted during their visit to the department. The results received from the examiners and their report from the last visit are documented in the civil engineering department and an action plan was designed and incorporated in the continuous improvement plan of the civil engineering program. The current external examiner and advisor are given in Table 4.6.

Table 4.6 Civil engineering external examiner and advisor

No.	External examiners and program advisors	photo
1.	Professor Dr Ir Muhd Fadhl Nuruddin Universiti Teknologi PETRONAS Department of Civil Engineering Bandar Labuan, Perak Darul Ridzuan, Malaysia Tel: 00605 - 368 7289 Email: nasirshafiq@petronas.com.my	
2.	Professor Dr Nasir Shafiq Universiti Teknologi PETRONAS Department of Civil Engineering Bandar Labuan, Perak Darul Ridzuan, Malaysia Tel: 00605 - 368 7289 Email: nasirshafiq@petronas.com.my	

Frequency of Assessment Processes

A summary of assessment processes and method are given in Table 4.7, which describes the classification, frequency, who collect the data, who process the data and by home the data analyzed and evaluated.

Table 4.7 Frequency of SO Assessment Processes

NO.	SO assessment process	Type of Assessment	Frequency	Data collected by	Data processing	Evaluated by
1	Course learning outcomes	Direct	Each semester	Instructor	Instructor	Assessment committee
2	Graduation Project	Direct	Each semester	Project advisor	Instructor	Assessment committee
3	Course Survey	Indirect	Each semester	Instructor	Instructor	Assessment committee
4	Exit Survey	Indirect	Each year	Surveys committee	Surveys committee	Assessment committee
5	Staff Survey	Indirect	Each semester	Surveys committee	Surveys committee	Assessment committee
6	Alumni	Indirect	Each year	Surveys committee	Surveys committee	Assessment committee
7	Employer	Indirect	Each year	Surveys committee	Surveys committee	Assessment committee
8	CE-IACI	Indirect	Evaluation every 3 years	Program Chairman	Curriculum committee	Assessment committee
9	External Examiner & Advisor	Indirect	Evaluation every 3 years	Program Chairman	Curriculum committee	Assessment committee

Samples of Assessment Results

Several important samples of assessment are given in the following pages. Detail assessment results could be seen in the quality corner of the civil engineering department.

Table 4.21: Course Learning Readiness for semester 1 year 2015-2016

S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
1	Pre-Requisite Courses	Response	18	Appropriate	13
				Inappropriate	5
		No Response	6	No Response	6
2	Pre-Requisite Abilities	Response	18	Appropriate	11
				Inappropriate	4
				Very Poor	3
		No Response	6	No Response	6
3	Class Schedule	Response	19	Appropriate	18
				Inappropriate	1
		No Response	5	No Response	5
4	Class Size	Response	19	Appropriate	18
				Too Big	1
		No Response	5	No Response	5
5	Class Space	Response	18	Appropriate	16
				Inappropriate	2
		No Response	6	No Response	6
56	Class Facilities	Response	19	Appropriate	15
				Inappropriate	5
		No Response	4	No Response	4
7	Class Environment	Response	19	Comfortable	18
				Noisy	0
				Disturbing	0
				Improper Temp.	1
				Improper Light	0
		No Response	5	No Response	5
8	Lab Equipment	Response	19	Appropriate	6
				Inappropriate	4
				Non-Existent	0
				Not Applicable	9
		No Response	5	No Response	5
9	Lab Utilities	Response	19	Appropriate	6
				Inappropriate	4
				Non-Existent	0
				Not Applicable	9
		No Response	5	No Response	5
10	Lab Assistants	Response	18	Appropriate	3
				Inappropriate	3
				Non-Existent	3
				Not Applicable	9
		No Response	6	No Response	6
11	Lab Class Size	Response	19	Appropriate	8
				Too Big	1
				Not Applicable	10
		No Response	5	No Response	5

Continued Table 4.21: Course Learning Readiness for semester 1 year 2015-2016.

S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
12	Required Software	Response	19	Appropriate	1
				Inappropriate	4
				Non-Existent	7
				Not Applicable	7
		No Response	5	No Response	5
13	Textbook Availability	Response	18	From Institution	8
				From Local Book	4
				From Overseas Book	0
				From Internet	3
				Difficult to Find	2
				Not Available	1
				Not Applicable	0
		No Response	6	No Response	6
14	Reference Material Availability	Response	19	From Institution	9
				From Local Book	2
				From Overseas Book	0
				From Internet	5
				Difficult to Find	1
				Not Available	0
				Not Applicable	2
		No Response	5	No Response	5
15	Teaching Assistants	Response	19	Appropriate	6
				Inappropriate	2
				Not Provided	8
				Not Needed	3
		No Response	5	No Response	5
16	Classroom WiFi	Response	19	Appropriate	14
				Inappropriate	3
				Non-Existent	0
				Not Applicable	2
		No Response	5	No Response	5
17	Lab WiFi	Response	19	Appropriate	7
				Inappropriate	3
				Non-Existent	0
				Not needed	9
				Custom answers	0
		No Response	5	No Response	5
18	Instructor's Office WiFi	Response	19	Appropriate	15
				Inappropriate	2
				Non-Existent	1
				Not needed	1
				Custom answers	0
				Custom answers	0
		No Response	5	No Response	5

Table 4.22 Course Learning Readiness for semester 2 year 2015-2016.

S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
1	Pre-Requisite Courses	Response	26	Appropriate	16
				Inappropriate	10
		No Response	0	No Response	0
2	Pre-Requisite Abilities	Response	26	Appropriate	13
				Inappropriate	12
				Very Poor	1
		No Response	0	No Response	0
3	Class Schedule	Response	24	Appropriate	21
				Inappropriate	3
		No Response	2	No Response	2
4	Class Size	Response	24	Appropriate	23
				Too Big	1
		No Response	2	No Response	2
5	Class Space	Response	24	Appropriate	20
				Inappropriate	4
		No Response	2	No Response	2
6	Class Facilities	Response	24	Appropriate	20
				Inappropriate	4
		No Response	2	No Response	2
7	Class Environment	Response	24	Comfortable	17
				Noisy	0
				Disturbing	1
				Improper Temp.	6
				Improper Light	0
		No Response	2	No Response	2
8	Lab Equipment	Response	24	Appropriate	11
				Inappropriate	4
				Non-Existent	1
				Not Applicable	8
		No Response	2	No Response	2
9	Lab Utilities	Response	24	Appropriate	8
				Inappropriate	6
				Non-Existent	1
				Not Applicable	9
		No Response	2	No Response	2
10	Lab Assistants	Response	24	Appropriate	9
				Inappropriate	4
				Non-Existent	2
				Not Applicable	9
		No Response	2	No Response	2
11	Lab Class Size	Response	24	Appropriate	11
				Too Big	3
				Not Applicable	10
		No Response	2	No Response	2

Continued Table 4.22: Course Learning Readiness for semester 2 year 2015-2016.

S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
12	Required Software	Response	24	Appropriate	7
				Inappropriate	6
				Non-Existent	3
				Not Applicable	8
		No Response	2	No Response	2
13	Textbook Availability	Response	26	From Institution	21
				From Local Book Store	2
				From Overseas Book Store	0
				From Internet	2
				Difficult to Find	0
				Not Available	0
				Not Applicable	0
		No Response	0	No Response	0
14	Reference Material Availability	Response	25	From Institution	17
				From Local Book Store	4
				From Overseas Book Store	0
				From Internet	2
				Difficult to Find	1
				Not Available	0
				Not Applicable	1
		No Response	1	No Response	1
15	Teaching Assistants	Response	24	Appropriate	6
				Inappropriate	6
				Not Provided	8
				Not Needed	4
		No Response	2	No Response	2
16	Classroom WiFi	Response	24	Appropriate	20
				Inappropriate	3
				Non-Existent	0
				Not Applicable	1
		No Response	2	No Response	2
17	Lab WiFi	Response	25	Appropriate	14
				Inappropriate	3
				Non-Existent	2
				Not needed	6
				Custom answers	0
		No Response	1	No Response	1
18	Instructor's Office WiFi	Response	24	Appropriate	23
				Inappropriate	1
				Non-Existent	0
				Not needed	0
				Custom answers	0
				Custom answers	0
		No Response	2	No Response	2

Results of Student weaknesses and Ways to Improve

CLOSO software provides the opportunity to the instructors to voice their concerns about the “Student weaknesses” and suggest “Ways to improve”. The instructors could select from a set of 17 weak points and also they could select any improvement methods from 17 methods listed. In addition, the instructors could any weak point not listed in the menu or add any new way to improve not in the list. The results of all these 17 weak points and method of improving for semester 1 and semester 2 year 2015-2016 are shown in Tables 4.23 and 4.24 respectively.

Table 4.23: Student weaknesses observations for the current academic year 2015-2016.

No.	Weakness	Semester 1	Semester 2
1.	Students' abilities were not according to the pre-requisite courses.	8	5
2.	Proficiency of students in the English language was not sufficient.	12	5
3.	Students were poor in computer programming.	4	1
4.	Students did not get practice on SO based questions.	1	1
5.	Students were weak in tools like PowerPoint/EXCEL/MATLAB/AutoCAD.	4	1
6.	Students did not take an interest in the course.	0	0
7.	Students did not do the home assignments properly.	4	4
8.	Students did not read the textbook at home.	8	7
9.	Students were lazy and unwilling to learn.	3	1
10.	The textbook for the course is not appropriate.	1	1
11.	Syllabus has too many topics and the time was not enough	5	3
12.	Assignments focusing the SOs were not enough.	0	0
13.	Home assignments were not corrected due to lack of teaching assistants.	2	4
14.	Questions in the assessments were above standard for this course.	0	0
15.	Instructor's absence from the lectures/labs without a replacement	0	0
16.	Lectures/labs were missed due to unscheduled events.	1	1
17.	Other than the above, please write in the following space	1	2

If the 17th item is observed as common among the instructors, an additional or more weakness can be added from the admin panel. Faculty members can provide the resource availability along with the students' weakness in a different tag named as ‘Learning Readiness’ of the CLOSO faculty surveying. In addition, the instructor proposes his plan in the ‘improvement plan’ tag and can implement his own plan himself in few items. Currently, the enlisted improvement plans are given in Table 4.24.

Table 4.24: Ways to improve SO attainments for the current academic year 2015-2016.

No.	Improvement Method	Semester 1	Semester 2
1.	Pre-requisites be modified	6	3
2.	Grading in pre-requisites with more weight on fundamental	4	6
3.	Students English proficiency is improved	9	5
4.	The CLO with week performance is addressed earlier in the semester	5	4
5.	More assignments related to the CLOs be given	3	5
6.	More Quizzes related to the week CLO be given	2	5
7.	Assessment marks for questions related to the weak CLO are increased.	2	4
8.	Students' admission policy be made stricter.	4	1
9.	Students' interest be improved through lectures/site-visits.	4	5
10.	A different textbook is specified.	0	2
11.	Syllabus of the course is revised	5	5
12.	Tutorial classes are arranged.	1	1
13.	Contact hours for the course be increased.	2	1
14.	Lab facilities be improved.	7	1
15.	Complexity of questions in assessments is reduced	1	1
16.	Errors in exams are explained with elaboration to the students.	1	0
17.	Other than the above, please write in the following space	0	1

Industrial Advisory Council (IAC)

The input from Civil Engineering Industrial Advisory Council (CE-IAC) has been primarily in the form of critiques/advice on issues related to the learning and teaching processes. IAC second meet was conducted in second semester year 2015-2016 as shown in Figure 4.96. Several important issues were discussed and suggested in the IAC meeting such as review of Mission, PEOs, SOs and curriculum of the civil engineering program. IAC emphasizes on concentrated care about soft skills, long life learning and professional development which are not easy to assess them in traditional lectures. Summary of comments and feedback from IAC meeting 2015-2016 are listed in Table 4.26 below.



Figure 4.96 Meeting civil engineering staff with external examiner and advisor year 2015-2016.

Table 4.26: Summary of suggestion for improvement from external examiner and advisor.

No.	Title	Detail
1.	Innovative activities	Emphasizes on concentrated care about soft skills, long life learning and professional development which are not easy to assess them in traditional lectures.
2.	Improve the collaboration with industry	Suggest forming a committee from staff, IAC members and students to collaborate for organizing a monthly activity to improve the professional development of student and graduate.
3.	Curriculum modification	Some suggestions come with encouraging review the program to include elective courses in several civil engineering areas.
4.	Jointly Consultant work and problem-solving	Collaborate with IAC members and civil engineering program to establish and increase the collaboration to serve civil engineers in Najran area by training courses and establish professional consultant joint work with the industry which may provide a real opportunity to the student for real life engineering problem.

External Examiner and Advisor

The input from the external examiner and advisor during their visit at the beginning of the year 2015-2016 will be discussed here. During the visit they reviewed the curriculum of the civil engineering program and prepared a report explaining the strength and weakness of the program. The report suggests several points for improvement of the program. The most important issues and recommendations in their report are listed Table 4.27 below.





Figure 4.97: Meeting civil engineering staff with external examiner and advisor year 2015-2016.

Table 4.27: Summary of suggestions for improvement from external examiner and advisor.

No.	Title	Detail
1.	Adding Courses	The advisor suggests to add few courses such as: 1. Course in the specification, contract and quantity survey. 2. Course in civil engineering system and drawing 3. Course in introduction to transportation
2.	Introduce elective courses	The advisor suggests providing two to three course as an elective course in each main area of civil engineering which could provide an option for the student to concentrate more knowledge in the area they preferred. Examples of such electives 1. Sustainability 2. building environment 3. Advanced concrete technology 4. recycling material 5. advance reinforced concrete design 6. Advanced steel design 7. repair and rehabilitation
3.	Pre-requisite	Pre-requisite of some courses need revision such as: 1. sanitary engineering currently no pre-requisite. 2. soil mechanics no pre-requisite 3. fluid mechanics no pre-requisite 4. construction material must study before reinforced concrete design
4.	Separate lab from theory	The advisor recommends separating the lab from the theory and making the lab as an independent course. This will help in the assessment the outcomes more efficient. 1. separate material lab from the theory 2. separate soil theory course from soil lab 3. separate lab for fluid and hydraulic from theory courses
5.	Flow of courses in lesson plan	Flow and distribution of courses over the semester and levels need revision (example foundation course must be in earlier level, similarly construction material, transportation and traffic)

Program outcomes Revision Process

The student outcomes are planned to be revised in a way similar to the revisions of PEOs as stated in . The revision process of the SOs is planned to be launched every three to five years or whenever there is a change in ABET Criterion 3 or the PEOs. Definitions and revisions of the student outcomes are discussed biennially by the assessment committee as a part of its assessment exercises; any recommended changes are then submitted as a draft recommendation to the department faculty for discussion and final approval. The assessment committee

additionally solicits feedback on the set of SOs from the external advisory board. Our current outcomes were last discussed with the advisory board in 2014 meeting; they recommended no changes. The revision of SOs will involve consultations with the program's constituencies. From these consultations the Assessment and Evaluation Committee will propose revisions to the SOs. The process is as follows:

- (1). Students will be involved in the process three ways:
 - a. The current SOs are published on the department web page and students are encouraged to present proposed revisions to the Civil Engineering Student Committee.
 - b. Close to the date of each revision, the Civil Engineering Student Committee will take students opinion about SO revisions through a questionnaire.
 - c. Each semester exit surveys are held for the graduating students. In this survey, in the year of revision of SOs, the graduating students will be asked about their opinion about the SOs and whether they want to add new SOs.
- (2). Alumni will be involved in the revision process through a survey of randomly selected alumni graduated within a period of 3 to 5 years from the date of survey. They will be sent a questionnaire to give their opinion on the following:
 - a. Do they see a need to modify any of the SOs?
 - b. Do they see a need to add a new SO?
- (3). Employers will also be involved in the revision process through a survey of major employers of the program graduates. They will be asked:
 - a. Do they see a need to modify any of the SOs?
 - b. Do they see a need to add a new SO?
- (4). Based on the data obtained through student survey, exit interviews, alumni surveys, employers' surveys, and the faculty survey data gathered through the CLOSO software during the last five years, the Assessment and Evaluation committee will form proposals for revisions of the PEOs. The assessment committee will provide answers to the following:
 - a. Are the revised SOs incorporate the outcomes of ABET Criterion 3?
 - b. Are the SOs attainable by our students?
 - c. What are the performance measures for the revised SOs?
 - d. Is there a need to revise the performance measures of the existing SOs?
 - e. What Bloom's Level of Learning is suitable for the SOs.
 - f. How the SOs are mapped to the PEOs
- (5). The proposals will be sent to the faculty for their input and then presented to the faculty in the department council meeting for discussion and approval.
- (6). Faculty will play the most important role in revising the SOs through the department council meetings.
 - a. Are the course CLOs covering all the SOs?
 - b. Do the specified LOL for SOs in accordance with the CLOs
- (7). The revised SOs approved by the department council will be sent to EAB members
- (8). EAB members will present their opinions in the EAB annual meeting
- (9). The department council will consider the recommendations of EAB and will give final approval to the revisions.

5. CONTINUOUS IMPROVEMENT

Continuous improvement is something very significant in the civil engineering program. For the last 5 years, there have been continuous improvements on numerous fronts including the curriculum, the assessment processes, academic advisement, career advisement, facilities, graduation project quality and assessment, etc. The whole process of improvement itself is being improved to obtain a highly sustainable system of assessment, evaluation and improvement. The processes used for evaluating the Student Outcomes (SOs) were described in Section A.4. In this section, we discuss the following:

- a) Using SO evaluations in the continuous improvement of the program.
- b) Results of changes made to the program.
- c) Future program improvement plans based on recent evaluations.

Instructor Course Continuous Improvement Process (ICCIP)

The first and probably the most important part of our continuous improvement plan is the instructor course continuous improvement process that deals with an instructor's teaching and assessment plan. We believe that improvements at this level contribute the most to the continuous improvement of the program through improvements in the course learning outcomes (CLOs) which lead to an improvement of student outcomes (SOs) because CLOs is linked to SOs. This process is described as follows:

In this process, the instructor identifies the weak CLO or SO and then comes up with changes in his teaching plan and any other actions that he alone can do to improve the learning outcome. The instructor treats the weakness in a particular CLO or a related SO by suggesting changes in the teaching plan to be implemented next time the course is taught. The instructor could also make the improvement during the same semester the course is taught. Some examples of the measures that are suggested in an ICCIP are as follows:

- 1) Timing of teaching particular topics
- 2) Timing of assessments for particular topics
- 3) Re-assessment of students with weak CLOs or weak SOs after giving them an opportunity to learn
- 4) Holding extra classes/tutorials to remove the weakness in particular CLOs or SOs
- 5) Increasing the number of quizzes or assignments in particular CLOs or SOs
- 6) Providing students with solutions to problems related to particular topics in which students face difficulty
- 7) Suggesting ways to increase the students' interest in topics related to weak CLOs or SOs
- 8) Arranging group discussions among the students
- 9) Ensuring that the students know about the nature of questions in the assessments in advance before the assessment
- 10) Re-designing the teaching plan to have more lectures, tutorials or laboratory sessions for the weak CLOs and SOs

It will be again emphasized that in this type of “Instructor Course Continuous Improvement Plan” (ICCIP), the focus is only on what an instructor can do without asking for approval from the program council or program chair. Such kind of an improvement plan is possible because, as described earlier, CLOSO produces CLOs and SOs satisfaction data for the instructors. From the data, the instructors can easily identify the CLOs and the SOs for the course with satisfaction level lower than the specified satisfaction criterion. If in a course, all CLOs and the relevant SOs are satisfied (i.e. 60% of the students or better obtain 60% marks), then no ICCIP is required, though an instructor may due to his own interest try to improve the learning outcomes even further and suggest an ICCIP.

Examples of ICCIP for 353CE-3 in semester 1 and semester 2 2015-2016

The basic information of course 353CE-3 was offered in semester 1, year 2015-2016 and was taught by Dr. Ahmad Salah is given in Figure 4.40. The same course was also offered in semester 2 year 2015-2016 and was taught by Dr. Hashem as stated in Figure 4.97. Teaching plan including the topics of the course and time distribution is presented in Figure 4.98 for both semesters. In the first semester the instructor distributes 45 contact hours to the course topic while in the second semester the instructor tries to improve the low attainment level of CLOs and the corresponding SOs supported by this course by adding 15 contact hours tutorials (one tutorial hour in each week). The total contact hours become 60 hours. The instructor also increased the contact hours of some topics leading to week attainment of certain CLOs.

Another improvement proposed by the instructor in the second semester is made in the assessment called final exam. The instructor made the final exam summative and comprehensive exam cover all outcomes each outcome assessed by a question and a 10 mark was allocated for each question and outcome. As seen in Figure 4.99 the instructor in the first semester does not include any assessment for CLO5 except attendance of the student. In addition the instructor in the second semester assesses each CLO by a dedicated homework including CLO5.

This ICCIP implemented by the instructor include in summary the following:

1. increase the contact hours for week CLOs
2. increase the contact hours for all CLOs by introducing one-hour tutorial each week
3. modifying the assessment methods such as homework to cover all CLOs
4. change and increase the number of question in the final exam to assess all CLOs

This ICCIP results in improvement of attainment level of all CLOs of the course as indicated in Figure 4.100. The level of attainment for CLO3 during semester 1 is 53% of the student score 60% mark (this is not achieved the satisfaction level) while after ICCIP implemented in the second semester 100% of the students score 60% mark which meets the satisfaction level stated by the program administration.

The assessment results of the three SOs supported by this course was obtained and presented in Figure 4.101. Based on this course, it is clear that these improvement actions taken by the ICCIP improved the attainment level of all the three SOs and raised it from 85% in semester 1 to 94% in semester 2. These results of implementing ICCIP indicated that the improvement plan was very efficient in program improvement and raising the attainment levels of both CLOs and SOs.

Course 353CE-3 Structural Analysis 2, Semester 1, 12015-2016, Instructor Dr. Ahmad

Class Information
Instructor's Name:
Ahmad Salah Edeen Hassaf
Course Number and Name:
353CE-3 (3, 0, 3) Structural Analysis (2)
Academic Year:
2015-16
Semester:
2 Term 1
Class Section:
1
Multiple Sections:
Not available (3)
No. of Assessments:
12
No. of students:
5

CLO-SO Map

CLO ID	Student Outcome (SOs)									
	s	a	s	a	s	a	s	a	s	a
CLO 1	1	0	0	0	1	0	0	0	0	1
CLO 2	1	0	0	0	1	0	0	0	0	1
CLO 3	1	0	0	0	1	0	0	0	0	1
CLO 4	1	0	0	0	1	0	0	0	0	1
CLO 5	1	0	0	0	1	0	0	0	0	1

CLO ID Course Learning Outcome (CLO) - Target Satisfaction criterion: 60% students get 60% marks.
1 Analysis of statically indeterminate structures by the Force method
2 Analysis of continuous beam and frames using slope-deflection method
3 Analysis of continuous beam and frame by the moment-distribution method
4 Analyse plane truss, beam and frame by the direct stiffness matrix
5 Compute reactions and member forces due to non-prismatic sections, support settlement, temperature changes and fabrication errors

Student Outcome (SOs) - Target Satisfaction criterion: 60% students get 60% marks.
1 (A) An ability to identify and apply knowledge of mathematics and sciences and engineering in civil engineering problems.
2 (B) An ability to design and conduct experiments, as well as to analyse and interpret data required for solving civil engineering projects.
3 (C) An ability to design optimum system/component of civil engineering facilities/infrastructures to meet desired needs using realistic constraints.
4 (E) An ability to function effectively in multi-disciplinary construction project/civil engineering teams.
5 (F) An ability to identify, formulate, and solve civil engineering problems and to evaluate and synthesise information in order to provide best alternative solutions.
6 (G) An ability to act professionally and ethically and recognise the impact of liability issues in civil engineering projects and constructions.
7 (H) An ability to communicate effectively prepare professional written materials, graphical communications and deliver professional oral and written presentations.
8 (I) An ability to recognise the broad education necessary to understand the impact of engineering solutions to economic, environmental and society and to improving quality of life.
9 (J) An ability to recognise the need in life long learning and to engage in continuing education of professional engineering skills.
10 (K) An ability to recognise the knowledge of contemporary issues in planning, designing, constructing, and rehabilitating civil engineering infrastructures.
11 (L) An ability to develop and use techniques and skills using modern engineering methods and tools needed in civil engineering practices.

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Course 353CE-3 Structural Analysis 2, Semester 2, 12015-2016, Instructor Dr. Hashem

Class Information
Instructor's Name:
Hashem Mohd Ali Al-Mutairah
Course Number and Name:
353CE-3 (3, 0, 3) Structural Analysis (2)
Academic Year:
2015-16
Semester:
2 Term 2
Class Section:
1
Multiple Sections:
Not available (3)
No. of Assessments:
8
No. of students:
17

CLO-SO Map

CLO ID	Student Outcome (SOs)									
	s	a	s	a	s	a	s	a	s	a
CLO 1	1	0	0	0	1	0	0	0	0	1
CLO 2	1	0	0	0	1	0	0	0	0	1
CLO 3	1	0	0	0	1	0	0	0	0	1
CLO 4	1	0	0	0	1	0	0	0	0	1
CLO 5	1	0	0	0	1	0	0	0	0	1

CLO ID Course Learning Outcome (CLO) - Target Satisfaction criterion: 60% students get 60% marks.
1 Analysis of statically indeterminate structures by the Force method
2 Analysis of continuous beam and frames using slope-deflection method
3 Analysis of continuous beam and frame by the moment-distribution method
4 Analyse plane truss, beam and frame by the direct stiffness matrix
5 Compute reactions and member forces due to non-prismatic sections, support settlement, temperature changes and fabrication errors

Student Outcome (SOs) - Target Satisfaction criterion: 60% students get 60% marks.
1 (A) An ability to identify and apply knowledge of mathematics and sciences and engineering in civil engineering problems.
2 (B) An ability to design and conduct experiments, as well as to analyse and interpret data required for solving civil engineering projects.
3 (C) An ability to design optimum system/component of civil engineering facilities/infrastructures to meet desired needs using realistic constraints.
4 (E) An ability to function effectively in multi-disciplinary construction project/civil engineering teams.
5 (F) An ability to identify, formulate, and solve civil engineering problems and to evaluate and synthesise information in order to provide best alternative solutions.
6 (G) An ability to act professionally and ethically and recognise the impact of liability issues in civil engineering projects and constructions.
7 (H) An ability to communicate effectively prepare professional written materials, graphical communications and deliver professional oral and written presentations.
8 (I) An ability to recognise the broad education necessary to understand the impact of engineering solutions to economic, environmental and society and to improving quality of life.
9 (J) An ability to recognise the need in life long learning and to engage in continuing education of professional engineering skills.
10 (K) An ability to recognise the knowledge of contemporary issues in planning, designing, constructing, and rehabilitating civil engineering infrastructures.
11 (L) An ability to develop and use techniques and skills using modern engineering methods and tools needed in civil engineering practices.

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Figure 4.97: Course information of 353CE-3 for Semester 1 and 2, year 2015-2016.

Course 353CE-3 Structural Analysis 2, Semester 1, 12015-2016, Instructor Dr. Ahmad

Re-Load	Topics to be covered during class hours	Lecture (Contact Hours)	Laboratory (Contact Hours)
1	Introduction to indeterminate structures	4	0
2	Define and classify the structure into determinate and indeterminate and determine the kinematic degree of freedom	2	0
3	Analysis of structures using consistent deformation method (force/flexibility)	10	0
4	Moment distribution method and sway consideration in analysis of frames	6	0
5	Slope Deflection Method and sway consideration in analysis of frames	12	0
6	Stiffness method for beams, trusses and frames	6	0
7	Pre-strain, temperature change, support movement effects and analysis of non-prismatic members.	5	0

Topics have been copied from the prescribed syllabus for the program. You may modify the sequence or break into sub-topics to suit your instruction plan.

Insert Row Above Insert Row Below Delete Row Row Height: 30

Total Lect. Hours: 45 Total Lab Hours: 0

Cancel OK

Course 353CE-3 Structural Analysis 2, Semester 2, 12015-2016, Instructor Dr. Hashem

Re-Load	Topics to be covered during class hours	Lecture (Contact Hours)	Laboratory (Contact Hours)
1	Introduction to indeterminate structures	4	0
2	Define and classify the structure into determinate and indeterminate and determine the kinematic degree of freedom	4	0
3	Analysis of structures using consistent deformation method (force/flexibility)	12	0
4	Moment distribution method and sway consideration in analysis of frames	12	0
5	Slope Deflection Method and sway consideration in analysis of frames	8	0
6	Stiffness method for beams, trusses and frames	12	0
7	Pre-strain, temperature change, support movement effects and analysis of non-prismatic members.	8	0

Topics have been copied from the prescribed syllabus for the program. You may modify the sequence or break into sub-topics to suit your instruction plan.

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Total Lect. Hours: 60 Total Lab Hours: 0

Cancel OK

Figure 4.98 Course Topics and time allocation of 353CE-3 for Semester 1 and 2, year2015-2016.

Course 353CE-3 Structural Analysis 2, Semester 1, 12015-2016, Instructor Dr. Ahmad

CLO-wise Raw Marks

	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5	Non-CLO
Maximum Raw Marks	12	14	10	14	0	0
Contribution to Final Grade (%)	12	14	10	14	0	0

Student ID	Student's Name	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5	Non CLO
1	432204603 رافعان جودان سراج آل مخ	7	5	0	3	0	0
2	433100663 ايمن عبدالرحمن بن محمد ا	12	10	2	14	0	0
3	433101391 كادي بساطد بسام الحارثي	9	12	4	12	0	0
4	433101764 سلطان احمد بساطد الحارثي	12	10	7	10	0	0
5	433103411 كادي محمد بن كادي القباري	9	12	4	7	0	0

Course 353CE-3 Structural Analysis 2, Semester 2, 12015-2016, Instructor Dr. Hashem

Assessment ID: 8 - Assessment Name: Final Test

Displaying: "Raw" Original Marks

Question-sets >>	QS: 1	QS: 2	QS: 3	QS: 4	QS: 5	Total
Maximum Raw Marks:	10	10	10	10	10	50
Contribution to Final Grade (%)	10	10	10	10	10	50
CLO addressed in each Question-set:	1	2	3	4	5	-
Dominant SO targeted in each Question-set:	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	-
Bloom's Taxonomy Level of each Question-set:	3	3	3	3	5	-

Student ID	Student's Name	QS: 1 (10)	QS: 2 (10)	QS: 3 (10)	QS: 4 (10)	QS: 5 (10)	Total (50)
1	431810372 كادي حسن سائمين الجوهري	3	6	9	4	5	27
2	432100247 بصفر حسان شاداد آل فطحي	6	10	10	9	7	42
3	432100908 محمد سعيد محمد آل سامح	6	9	9	9	6	39
4	432102204 كادي فهد محمد آل هذلاه	7	7	9	9	7	39
5	432202349 كادي ربيع محمد آل هذلاه	6	9	9	9	5	38
6	432204269 احمد سميت مبخوت الصبيحي	6	9	9	6	6	36
7	432204603 رافعان جودان سراج آل مخ	6	9	8	9	7	39
8	433100991 هادي جودان بن جودان ا	7	6	8	8	2	31
9	433101558 كادي كادي بن كادي الهادي	9	8	10	8	8	43
10	433101910 كادي كادي احمد اباضي	6	10	10	8	8	42
11	433102041 كادي كادي بن كادي آل نو	8	10	10	10	9	47
12	433103075 كادي سام جود الهادي	8	10	10	9	9	46
13	433205817 فهد ابو بكر محمد بن جودان	8	9	10	10	7	44
14	433205819 كادي فيصل كادي بن شم	10	10	8	10	7	45
15	433205620 احمد كادي بن احمد السكاك	6	10	10	10	7	43
16	433205630 حسن كادي بن شاذله	9	9	10	9	10	47
17	434100520 يوسف كادي احمد ابو كادي	8	10	10	9	4	41

Figure 4.99: Assessment of CLOs by final exam for 353CE-3 for Semester 1 and 2, year2015-2016.

Course 353CE-3 Structural Analysis 2, Semester 1, 12015-2016, Instructor Dr. Ahmad													
CLO Satisfaction Data													
Assessment Name	CLO1 M	CLO1 P	CLO2 M	CLO2 P	CLO3 M	CLO3 P	CLO4 M	CLO4 P	CLO5 M	CLO5 P	Non-CLO M	Non-CLO P	
► Assignment 1	0.6	100	0	0	0	0	0	0	0	0	0	N/A	
Assignment 2	0.6	100	0	0	0	0	0	0	0	0	0	N/A	
Assignment 3	0.6	100	0	0	0	0	0	0	0	0	0	N/A	
Assignment 4	0.6	100	0	0	0	0	0	0	0	0	0	N/A	
Assignment 5	0	0	0.6	100	0	0	0	0	0	0	0	N/A	
Assignment 6	0	0	0.6	100	0	0	0	0	0	0	0	N/A	
Assignment 7	0	0	0	0	0.6	100	0	0	0	0	0	N/A	
Assignment 8	0	0	0	0	0	0	0.6	100	0	0	0	N/A	
Mid-Term 1	14	100	6	60	0	0	0	0	0	0	0	N/A	
Mid-Term 2	0	0	10	80	10	80	0	0	0	0	0	N/A	
Final Exam	12	80	14	80	10	20	14	60	0	0	0	N/A	
Attendance	1	80	1	80	1	80	1	80	1	80	0	N/A	
Weighted Average	29.5	91	32.2	77	21.6	53	15.6	63	1	80	0	N/A	

M: Marks allocated to the respective CLO for each Assessment
P: Percentage of students scoring 60% or better.
Target satisfaction criterion for the program is: 60% students get 60% or above.

Course 353CE-3 Structural Analysis 2, Semester 2, 12015-2016, Instructor Dr. Hashem													
CLO Satisfaction Data													
Assessment Name	CLO1 M	CLO1 P	CLO2 M	CLO2 P	CLO3 M	CLO3 P	CLO4 M	CLO4 P	CLO5 M	CLO5 P	Non-CLO M	Non-CLO P	
► Homework 1	2	94	0	0	0	0	0	0	0	0	0	N/A	
Homework 2	0	0	2	94	0	0	0	0	0	0	0	N/A	
Homework 3	0	0	0	0	2	100	0	0	0	0	0	N/A	
Homework 4	0	0	0	0	0	0	2	82	0	0	0	N/A	
Homework 5	0	0	0	0	0	0	0	0	2	76	0	N/A	
Test 1	10	100	10	100	0	0	0	0	0	0	0	N/A	
Test 2	0	0	0	0	10	100	10	100	0	0	0	N/A	
Final Test	10	94	10	100	10	100	10	94	10	76	0	N/A	
Weighted Average	22	97	22	99	22	100	22	96	12	76	0	N/A	

M: Marks allocated to the respective CLO for each Assessment
P: Percentage of students scoring 60% or better.
Target satisfaction criterion for the program is: 60% students get 60% or above.

Figure 4.100: Attainment level of CLOs for 353CE-3 for Semester 1 and 2, year2015-2016.

Course 353CE-3 Structural Analysis 2, Semester 1, 12015-2016, Instructor Dr. Ahmad

SO Satisfaction Data

Student Outcomes >>		a		b		c		d		e		f		g		h		i		j		k	
Assessment Name		M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P
Assignment 1		0.2	100							0.2	100											0.2	100
Assignment 2		0.2	100							0.2	100											0.2	100
Assignment 3		0.2	100							0.2	100											0.2	100
Assignment 4		0.2	100							0.2	100											0.2	100
Assignment 5		0.2	100							0.2	100											0.2	100
Assignment 6		0.2	100							0.2	100											0.2	100
Assignment 7		0.2	100							0.2	100											0.2	100
Assignment 8		0.2	100							0.2	100											0.2	100
Mid-Term 1		6.7	100							6.7	100											6.7	100
Mid-Term 2		6.7	80							6.7	80											6.7	80
Final Exam		16.7	80							16.7	80											16.7	80
Attendance		1.7	80							1.7	80											1.7	80
Cumulative Sum (Out of 100)		33.3	85							33.3	85											33.3	85

M: Marks allocated to the respective SO for each Assessment
P: Percentage of students scoring 60% or better.
Target satisfaction criterion for the program is: 60% students get 60% or above.

Course 353CE-3 Structural Analysis 2, Semester 2, 12015-2016, Instructor Dr. Hashem

SO Satisfaction Data

Student Outcomes >>		a		b		c		d		e		f		g		h		i		j		k	
Assessment Name		M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P
Homework 1		0.7	94							0.7	94											0.7	94
Homework 2		0.7	94							0.7	94											0.7	94
Homework 3		0.7	100							0.7	100											0.7	100
Homework 4		0.7	82							0.7	82											0.7	82
Homework 5		0.7	76							0.7	76											0.7	76
Test 1		6.7	100							6.7	100											6.7	100
Test 2		6.7	100							6.7	100											6.7	100
Final Test		16.7	94																			16.7	94
Cumulative Sum (Out of 100)		33.3	96							33.3	96											33.3	96

M: Marks allocated to the respective SO for each Assessment
P: Percentage of students scoring 60% or better.
Target satisfaction criterion for the program is: 60% students get 60% or above.

Figure 4.101: Attainment level of SOs using 353CE-3 for Semester 1 and 2, year2015-2016.

Continuous Improvement Based on Direct Courses Assessment

Comparison between attainment level of SOs based on Direct Courses Assessment for both semester 1 and 2 the year 2015-2016 is given in Figure 4.102. The results of both semester 1 and semester 2 year 2015-2016 indicate that the SO attainment level is exceeding the satisfaction base 60% for all SOs. Improvement from all instructors teaching all core courses have been compiled and evaluated by the assessment committee and continuous improvement plan has been established for implementation. The proposed continuous improvement plan is presented below.

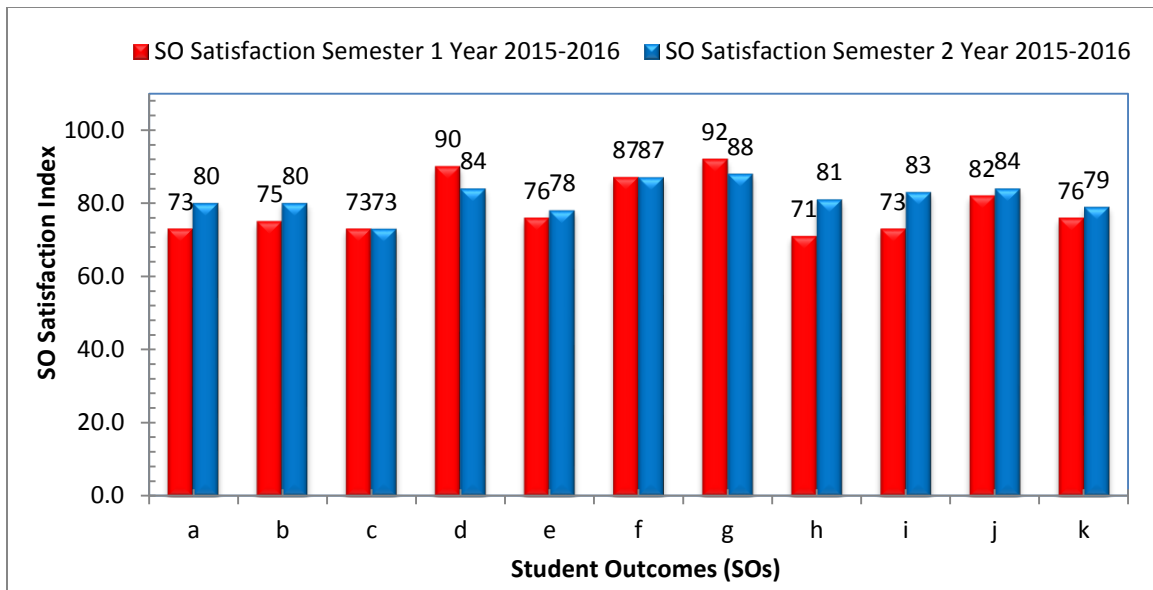


Figure 4.102 comparison of SO attainment level between semester 1 and 2 -2015-2016.

As stated earlier, that the instructors can provide their suggestions through CLOSO, course review and course report of their courses on those issues where substantial improvement of the program is also possible. For the current academic calendar, the following improvement proposals have been obtained from the faculty members. According the feedback coming from the instructors in all courses in Closo software in both semesters 1 and 2 2015-2016 we divided the improvement action into two categories:

- (1). Improvement based on the current student curriculum: In this part many comments came from the instructors regarding the following points:
 - (a). Changing the mapping of some courses with was not correct
 - (b). Modified the content of some courses by adding or deleting them
 - (c). Adjust the prerequisite courses of some courses
 - (d). Changing the textbooks
 - (e). Adjusting the flow of some important courses.

All these modifications have been transferred to the curriculum committee in the CE department for more discussion and investigation in order to convey their comments to the civil engineering program council for a final decision. The proposal from the curriculum committee has been approved by civil engineering program council and it will be implemented in first semester 2016/2017.

- (2). Improvement based on creating new study plan:
 - (a). Adding new course such as Quantity surveying and estimating course as this course was not offered in our current curriculum
 - (b). Separating the labs from the course in all course contains laboratory experiments
 - (c). Adding elective courses in all areas of civil engineering
 - (d). Modified the content of some courses by adding or deleting them in the new curriculum which will be implemented next year

The civil engineering council responded to the above issues and asked the curriculum committee to establish a modified new curriculum taking into account all the above matters and incorporate the feedback received from the report of the external examiner and civil engineering advisory council. The committee proposed a modified curriculum and reviewed several times by the input from all staff from the program. The program council has been approved the new proposal and further steps in progress for approval from the institution.

(3). Improvement plans to overcome the ability of student of pre-requisites

The action plan implemented in the last year 2014-2015 by adding a tutorial hour weekly for most core courses has improved the student ability but still some lecturer explain the need for improvement for this issue. The program administration comes with the following additional improvement.

The NU registration system is programmed to automatically disallow registration of any course if the student does not complete the prerequisite course(s) in order to efficiently avoid any kind of violation. However, the department had regulated starting from the next semester (first semester of 2016-2017) it is compulsory to adhere to not allowing any more pre-requisite violations and all the special cases mentioned in Section B.3 from Criterion 1 will be fully annulled.

Continuous Improvement Based on Direct GP Assessment

As shown in Figure 4.103 All SOs has achieved the satisfaction attainment level set by program administration in both semester 1 and 2 years 2015 and 2016. The results also indicate a slight improvement in the level of attainment for all SOs. Even though, several weak points and issues were raised from the evaluation of the assessment. The most important issues are listed below:

- 1) Inflation of marks recorded by instructors.
- 2) CLOs of graduation project need revise.
- 3) Mapping of some CLOs and SOs is not correct.
- 4) Some difficulties in related marks to certain CLOs.
- 5) Guideline for detail assessment plan of graduation project is needed.
- 6) Inconsistent of assessment method and mark distribution between different supervisors.
- 7) Rubric for moderation of assessment marks assigned by both supervisors and panel.

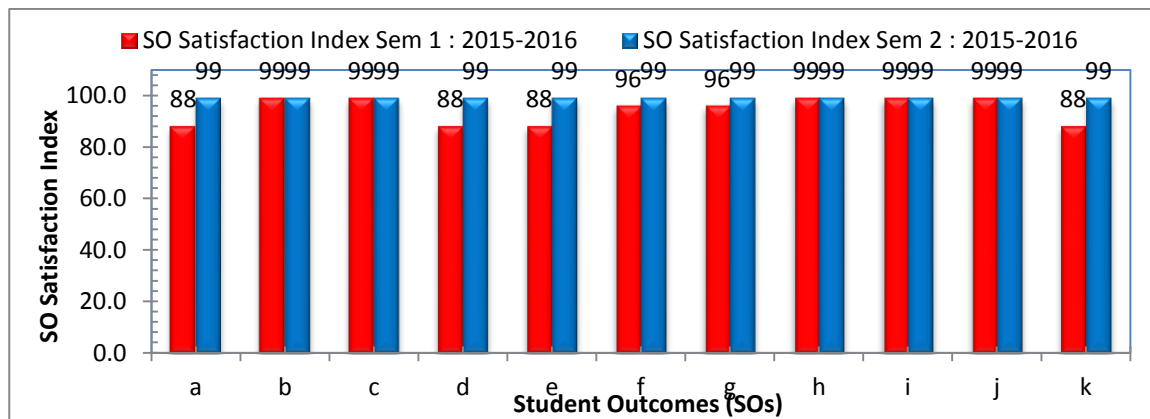


Figure 4.103 Level of attainment of SOs based on graduation project direct assessment.

To overcome these issues and weaknesses the civil engineering council request the graduation project committee to review the direct assessment of graduation projects considering all feedback received from the staff. The committee comes with a proposal with a substantial change in the assessment of both graduation project 1 and 2. The program council reviewed the proposal and approved the new assessment method to be implemented in the next semester (semester 1 2016-2017). A detailed guideline for graduation project including the new assessment plan, all forms and information were made available to staff and student in soft and hard copy and it is uploaded to the civil engineering website.

The new improved assessment method includes;

- (1). A new set of CLOs has been established for each graduation project.
- (2). A mapping of CLOs and SOs was established.
- (3). Marks allocation for each assessment method also provided.
- (4). Rubric design to guide and moderate the marks for each assessment method was also established.
- (5). One workshop which will be organized at the beginning of each semester for the supervisors and new staff join the program to raise the understanding of graduation project assessment.

The details of the proposed new assessment method for graduation project are presented in the following sections.

CLOs of graduation project

The graduation project committee proposed a new CLOs for graduation project 1 (491CE-2) and graduation project 2 (492CE-2). Civil engineering program council approved the new CLOs, new assessment plan, revised mapping of CLOs and SOs. The new plan will be implemented in semester 1 2016-2017. Table 4.27 and 4.28 presented the new CLOs for 491CE-2 and 492CE-2 respectively.

Table 4.27 CLOs for Graduation Project 1 (491CE-2).

Code	Course Learning Outcomes
CLO1	Identify and formulate and solve engineering problems in project of civil engineering
CLO2	Plan a project effectively using project planning techniques to ensure proper timing and budgeting.
CLO3	Review the available literature, methodology and testing in the project domain.
CLO4	Conduct proper design concept for all element in the project.
CLO5	Take into consideration all issues relating to public, safety and environment in project alternatives.
CLO6	Act on the professional and ethical way during conducting project tasks.
CLO7	Communicate effectively in writing engineering report and oral presentation.
CLO8	Work effectively as a member of the team and improve his self-learning.

Table 4.28 CLOs for Graduation Project 2 (492CE-2).

Code	Course Learning Outcomes
CLO1	formulate and provide a solution for engineering problems in the project of electrical Engineering
CLO2	Contribute and coordinate the project work with his teams and upgrade his ability for independent learning
CLO3	Conduct enough literature review and use tool in the project domain and design procedures related to project
CLO4	Design a system, component or process with defined constraints
CLO5	Consider all issues relating to public, safety and environment in project alternatives and Investigation of complex problems using proper techniques, tools and resources
CLO6	Carry out all project task in ethical and professional manner
CLO7	Collect and analyze data, and draw conclusions from experiments while testing a project
CLO8	Communicate effectively in written and oral forms, and achieve ethical aspects.

Mapping the CLOs of graduation project with SOs

Mapping the CLOs of the graduation project 491CE-1 and 492CE-2 with SOs is shown in Table 4.29 and 4.30 respectively.

Table 4.29: Mapping of Graduation Project 1 CLOs with SOs.

CLO ID	A	b	C	d	E	f	g	h	i	j	k
CLO1	1	0	0	0	1	0	0	0	0	0	1
CLO2	0	0	0	0	1	0	0	0	0	0	1
CLO3	0	1	0	0	0	0	0	0	0	0	0
CLO4	0	0	1	0	0	0	0	0	0	0	0
CLO5	0	0	1	0	0	0	0	1	0	1	0
CLO6	0	0	0	0	0	1	0	0	0	0	0
CLO7	0	0	0	0	0	0	1	0	0	0	0
CLO8	0	0	0	1	0	0	0	0	1	0	0

Table 4.30: Mapping of Graduation Project 2 CLOs with SOs.

CLO ID	A	b	c	d	E	f	G	h	i	J	K
CLO1	1	0	0	0	1	0	0	0	0	0	1
CLO2	0	0	0	1	0	0	0	0	1	0	0
CLO3	0	0	1	0	1	0	0	0	0	0	1
CLO4	0	0	1	0	0	0	0	0	0	0	1
CLO5	0	0	0	0	0	0	0	1	0	1	0
CLO6	0	0	0	0	0	1	0	0	0	0	0
CLO7	0	1	0	0	0	0	0	0	0	0	0
CLO8	0	0	0	0	0	0	1	0	0	0	0

Assessment of Graduation Project

The Graduation Project (GP) assessment is based on the Student's accomplishment and capability to prepare a project proposal, project report, materials and poster for presentation, oral presentation during the seminars and effective use of the logbook. Assessment is done by the supervisor and assessment panel separately and discretely. The distribution of marks for the two components above is:

- Assessment Panel : 50% (used as final exam)
- Supervisor : 50% (used as course work)

The Graduation Project marks justification is shown in Table 4.31. The graduation project grading form process is provided in the graduation project guideline and all the forms could be downloaded from the department website. In addition, a brief explanation of the assessment procedures and marks allocation is presented below. The data will be used for input to the Graduation Project template of CLOSO software. CLOSO will calculate the final grade and the satisfaction of each CLO and SO.

Table 4.31 GP Marks Justification

Project Examiners	Marks						
	Graduation Project 1 (491CE-2)			Graduation Project 2 (492CE-2)			
Supervisor	Logbook	Project Report	Total	Logbook	Final Report Draft	Total	
	30	20	50	30	20	50	
Assessment Panel	Presentation	Project Repoert	Total	Presentation and Poster	Final Report Draft	Total	
	23	27	50	23	27	50	
Total			100	Total			100

For each of the two semesters of Graduation Project, the project supervisor submits the assessment data using excel spreadsheet. The project supervisor needs just to enter the marks obtained by the students in the project group for each task. Tables 4.32, 4.33, 4.34 and 4.35 show the list of criteria for the Graduation Project 1 and 2. It also shows the relative weight of each criterion and the CLO it belongs to.

Table 4.32 Supervisor Assessment for Logbook of Graduation Project 1 and 2.

Logbook Assessment (30 Marks)				
No.	Criteria	CLO		Weight
		Project 1	Project 2	
L1	Regularity and attendance	CO6	CO6	3
L2	Attitude and Ability to conduct project and team work	CO8	CO2	2
L3	Weekly activities	CO3	CO3	3
L4	Project planning, implementation chart and budgeting	CO2	CO3	2
L5	Contents	CO1	CO1	3
L6	Organization	CO7	CO7	2
L7	Use tools and software	CO2	CO5	2
L8	Testing and methodology	CO3	CO7	3
L9	Design elements and component	CO4	CO4	3
L10	Ethics	CO6	CO6	2
L11	Completeness and Accuracy	CO4	CO4	2
L12	Independence and self-learning	CO8	CO2	3
Total				30

Table 4.33 Supervisor Assessment for Report of Graduation Project 1 and 2 (491CE-1)

Report Assessment (20 Marks)				
No.	Criteria	CLO		Weight
		Project 1	Project 2	
R1	Style and Format	CO7	CO8	2
R2	Language (Spelling, Wording, Grammar)	CO7	CO8	2
R3	Information Literacy	CO8	CO3	3
R4	Citations	CO6	CO6	1
R5	Organization	CO2	CO2	2
R6	Contents and Creativity	CO1	CO1	3
R7	Testing, methodology and use of tools and software	CO3	CO7	2
R8	Design elements and component	CO4	CO4	3
R9	Ethics	CO6	CO6	1
R10	Completeness and Accuracy	CO5	CO5	1
Total				20

Table 4.34: Examination Panel Assessment for Presentation of Graduation Project 1 and 2.

Presentation Assessment (23 Marks)				
No.	Criteria	CLO		Weight
		Project 1	Project 2	
P1	Communication: Nonverbal Skills	CO7	CO8	1
P2	Communication: Grammar	CO7	CO8	2
P3	Time dedicated to project work	CO8	CO3	2
P4	Professional Attire	CO6	CO6	1
P5	Visual Aids	CO2	CO2	2
P6	Content: Main Idea	CO1	CO1	3
P7	Content: Organization	CO3	CO7	3
P8	Content: Support	CO4	CO4	3
P9	Self-Reflection	CO6	CO6	2
P10	Responses to Questions	CO5	CO5	4
Total				23

Table 4.35: Examination Panel Assessment for Report of Graduation Project 1 and 2.

Report Assessment (27 Marks)				
No.	Criteria	CLO		Weight
		Project 1	Project 2	
R1	Style and Format	CO7	CO8	2
R2	Language (Spelling, Wording, Grammar)	CO7	CO8	3
R3	Information Literacy	CO8	CO3	3
R4	Citations	CO6	CO6	1
R5	Organization	CO2	CO2	2
R6	Contents and Creativity	CO1	CO1	4
R7	Testing, methodology and use of tools and software	CO3	CO7	3
R8	Design elements and component	CO4	CO4	5
R9	Ethics	CO6	CO6	2
R10	Completeness and Accuracy	CO5	CO5	2
Total				27

Rubric for Graduation Project Assessment

The Graduation Project Assessment done by the supervisor and examination panel as described in the above table can be assessed through different criteria. The supervisor tries to follow a guideline in the marking of these criteria according to the description rubrics are given below in different assessment methods like the logbook, presentation, and project report. Rubrics for assessment of graduation project 1 and 2 are given in Table 4.36 through Table 4.39.

Table 4.36 Rubric Design - Supervisor Assessment for Logbook of Graduation Project 1 and 2.

ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $\frac{R \times W}{5}$
		1 Resubmission Necessary	2 Below Expectations	3 Meets Expectations	4 Above Expectations	5 Exceeds Expectations					
L1	Regularity and attendance	Rarely, the student meets the supervisor and many times do not submit the deliverables.	The student has a serious problem with keeping agreed to meet and deadlines. The supervisor has not been able to get a picture of the status of the work during the project.	The student has been late to meetings or in sending deliverables in a way that have hampered the process. The Supervisor had to prompt the students with questions about the status of the work.	The student has mostly sent deliverables on agreed dates. With only a few exceptions, student(s) have been on time to meetings and in reporting their progress.	Student has kept continuous contact during the work and has been on time both to meetings and in sending deliverables.				3	
L2	Attitude and Ability to conduct project and team work	Hardly shows enthusiasm towards the project with almost no initiative, inquisition, commitment and team spirit seen.	Less enthusiasm than the average where inquisition, commitment and teamwork spirit are all at a lower level or being more dependent on the supervisor than own initiative.	Lack of enthusiasm towards the project, which is seen in the lack of inquisition, commitment, and teamwork spirit.	Enthusiastic towards the project and seen in constant inquisition, full commitment, and functioning teamwork spirit	Very enthusiastic towards the project and obviously seen in striking inquisition, extraordinary commitment, and seamless teamwork spirit.				2	
L3	Weekly activities	The common activities lagged unacceptably behind and refused to adjust to any change.	The activities are all delayed longer than the planned and adjusting poorly to changes.	The activities are mostly slightly delayed compared to the planned and adjusting rather slowly to changes	Most of the activities are conducted in accord to plan and adjusting appropriately to changes	Activities progress earlier than planned as well as adjusting swiftly and creatively to changes				3	
L4	Project planning, implementation chart and budgeting	Almost ignorant and senseless. The project plan is not prepared in completion.	The project plan is ambitiously or not fully prepared with a lower level of organization, and less convincingly applicable.	The project plan is prepared but the lack of organization but seemed applicable.	Project plan is efficiently prepared, well-organized and convincingly applicable	The project proposal is very soundly prepared, neatly organized and affirmatively applicable.				2	
L5	Contents	Many materials not connected to the purpose	Material lacks the relevant content. Details lack a clear connection to the purpose. Everything seems as important as everything else.	Material content is Appropriate. Some details are present to support the main idea. Some of the significant points are identified	Material content is clear and appropriate. Some details are present to support the main idea. Significant points are identified	Material content is clear and concise. Accurate details are present to support the main idea. Significant points are well identified				3	

Continued Table 4.36 Rubric Design - Supervisor Assessment for Logbook of Graduation Project 1 and 2.

ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $\frac{R \times W}{5}$
			1 Resubmission Necessary	2 Below Expectations	3 Meets Expectations	4 Above Expectations	5 Exceeds Expectations				
L6	Organization		No progression of ideas is evident; does not use transitions.	Rarely provides a progression of ideas; rarely uses transitions.	Provides an adequate progression of related ideas with some transitions.	Provides an effective progression of related ideas with transitions.	Provides a sophisticated progression of related ideas with transitions.			2	
L7	Use tools and software		Do not Prepare and learn suitable and modern techniques and tools needed for the project	Prepare and learn few suitable and modern techniques and tools needed for the project	Prepare and learn some suitable and modern techniques and tools needed for the project	Prepare and learn most suitable and modern techniques and tools needed for the project	Prepare and learn all suitable and modern techniques and tools needed for the project			2	
L8	Testing and methodology		Collecting improper data, and testing according to specified standard. No use of modern tool and techniques in the field	Collecting limited necessary data, and analysis few testing according to specified standard. Use of very limited modern tool and techniques in the field	Collecting some necessary data, and analysis some testing according to specified standard. Use of few modern tool and techniques in the field	Collecting most necessary data, analysis and most testing according to specified standard. Use of some modern tool and techniques in the field	Collecting all necessary data, and analysis all testing according to specified standard. Use of modern tool and techniques in the field			3	
L9	Design elements and component		Weak and mistakes in design. do not follow standard codes and improper integration of design and no alternatives were provided	Conduct limited design according to standard codes and integrate design and no alternatives were provided	Conduct some design according to standard codes and integrate design and provides few alternatives	Conduct most design according to standard codes and integrate design and provide some alternatives	Conduct all design according to standard codes and integrate design and provide many alternatives			3	
L10	Ethics		Does not use ethical standard in producing an original product.	Minimally demonstrates use of ethical standards in producing an original product.	Adequately demonstrates use of ethical standards in producing an original product.	Effectively demonstrates use of ethical standards in producing an original product.	Consistently demonstrates sophisticated use of ethical standards in producing an original product.			2	
L11	Completeness and Accuracy		No description of important outcomes	Incomplete, inaccurate description of important outcomes	Complete, inaccurate description of important outcomes	Incomplete, accurate description of important outcomes	Complete, accurate description of important outcomes			2	
L12	Independence and self-learning		Supervisor had to manage the project but the students also not follow and not carrying out the work.	Supervisor had to manage the project and direct the students in carrying out the work.	Supervisor has given a lot of help to the students in managing the project and carrying out the work.	The student has managed the project and carried out the work with some help from the supervisor.	Student has independently managed the project and carried out the work.			3	

Table 4.37 Rubric Design - Supervisor Assessment for Report of Graduation Project 1 and 2.

ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $R \times W$ 5
		1 Resubmission Necessary	2 Below Expectations	3 Meets Expectations	4 Above Expectations	5 Exceeds Expectations					
R1	Style and Format	Incomplete pages and improper format. Not follow the proposed guideline.	Preliminary pages are not as required. The improper caption of tables and figures. sometimes follow the guideline.	Preliminary pages are as required. The title of tables and figures can be improved. Generally follow guideline	Preliminary pages are as required. The tables and figures have the proper captions. Mostly follow guideline	Preliminary pages are as required. Tables and figures have the proper format and captions. Always follow guideline				2	
R2	Language (Spelling, Wording, Grammar)	The error on most pages and the level of writing is not accepted and need resubmit	Errors are serious and numerous. Reader must stop and reread and may struggle to discern the writer's intention. Multiple, serious errors.	Frequent errors that impede the flow of communication. Ok with <15 errors.	Occasional errors that have only minor impact on the flow of communication. Good with <10 errors	There are no errors that impair the flow of communication. Perfect with <5 errors				2	
R3	Information Literacy	No References or/and incorrect. No evidence of credible primary and secondary sources is	References are incomplete and incorrect. Rarely integrates credible primary or secondary sources.	References are given occasionally. Adequately integrates credible primary or secondary sources.	Adequate references are given. effectively integrates a variety of credible primary and secondary sources.	Complete references are given. Conscientiously and consistently integrates a variety of credible primary and secondary sources.				3	
R4	Citations	Does not demonstrate an understanding of how to use quotes, paraphrases, in-text citations, or works cited.	Uses quotes, paraphrases, and in-text citations and follows most formatting rules for documentation and works cited.	Uses quotes, paraphrases, and in-text citations adequately and follows formatting rules for documentation and works cited.	Uses quotes, paraphrases, and in-text citations properly and follows formatting rules for documentation and works cited.	Uses quotes, paraphrases, and in-text citations in a refined manner and follows all formatting rules for documentation and works cited.				1	
R5	Organization	No progression of ideas is evident; does not use transitions.	Rarely provides a progression of ideas; rarely uses transitions.	Provides an adequate progression of related ideas with some transitions.	Provides an effective progression of related ideas with transitions.	Provides a sophisticated progression of related ideas with transitions.				2	

Continued Table 4.37 Rubric Design - Supervisor Assessment for Report of Graduation Project 1 and 2.

Continued Table 55: Rubric Design – Super User Assessment for Report of Graduation Project 1 and 2											
ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $R \times W$ 5
			1 Resubmission Necessary	2 Below Expectations	3 Meets Expectations	4 Above Expectations	5 Exceeds Expectations				
R6	Contents and Creativity		The necessary and important material is not provided. Demonstrates no creative thinking, decision making, reasoning, and/or problem solving.	Material lacks the relevant content. Details lack a clear connection to the purpose. Everything seems as important as everything else. Demonstrates limited creative thinking, decision making, reasoning, and/or problem solving.	Material content is Appropriate. Some details are present to support the main idea. Some of the significant points are identified. Demonstrates Adequate creative thinking, decision making, reasoning, and/or problem solving.	Material content is clear and appropriate. Some details are present to support the main idea. Significant points are Identified. Demonstrates effective creative thinking, decision making, reasoning, and/or problem solving.	Material content is clear and concise. Accurate details are present to support the main idea. Significant points are well identified. Demonstrates sophisticated creative thinking, decision making, reasoning, and/or problem solving.			3	
R7	Testing, methodology and use of tools and software		Collecting improper data, and testing according to specified standard. No use of modern tool and techniques in the field	Collecting limited necessary data, and analysis few testing according to specified standard. Use of very limited modern tool and techniques in the field	Collecting some necessary data, and analysis some testing according to specified standard. Use of few modern tool and techniques in the field	Collecting most necessary data, analysis and most testing according to specified standard. Use of some modern tool and techniques in the field	Collecting all necessary data, and analysis all testing according to specified standard. Use of modern tool and techniques in the field			2	
R8	Design elements and component		Week and mistakes in design. donot follow standard codes and improper integration of design and no alternatives were provided	Conduct limited design according to standard codes and integrate design and no alternatives were provided	Conduct some design according to standard codes and integrate design and provides few alternatives	Conduct most design according to standard codes and integrate design and provide some alternatives	Conduct all design according to standard codes and integrate design and provide many alternatives			3	
R9	Ethics		Does not use ethical standard in producing an original product.	Minimally demonstrates use of ethical standards in producing an original product.	Adequately demonstrates use of ethical standards in producing an original product.	Effectively demonstrates use of ethical standards in producing an original product.	Consistently demonstrates sophisticated use of ethical standards in producing an original product.			1	
R10	Completeness and Accuracy		No description of the important outcomes	Incomplete, inaccurate description of important outcomes	Complete, inaccurate description of important outcomes	Incomplete, accurate description of important outcomes	Complete, accurate description of important outcomes			1	

Table 4.38 Rubric Design - Examination Panel Assessment for Presentation of Graduation Project 1 and 2.

ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $R \times W$ 5
		1 Resubmission Necessary	2 Below Expectations	3 Meets Expectations	4 Above Expectations	5 Exceeds Expectations					
P1	Communication: Nonverbal Skills	Does not employ nonverbal skills.	Employs few nonverbal skills.	Adequately employs nonverbal skills.	Effectively employs nonverbal skills.	Masterfully employs nonverbal skills.				1	
P2	Communication: Grammar	Does not employ proper grammar and articulation.	Rarely employs proper grammar and articulation.	Adequately employing proper grammar and articulation.	Effectively employs proper grammar and articulation.	Masterfully employs proper grammar and articulation.				2	
P3	Time dedicated to project work	Is off prescribed guidelines by more than 2 minutes.	Is off prescribed guidelines by 1-2 minutes.	Is off prescribed guidelines by 30-60 seconds.	Is off prescribed guidelines by 15-30 seconds.	Adheres to prescribed time guidelines.				2	
P4	Professional Attire		Does not wear appropriate attire.			Wears appropriate attire.				1	
P5	Visual Aids	Employs no visual aids.	Minimally employs visual aids.	Adequately employs visual aids that reinforce presentation.	Effectively employs visual aids that enrich or reinforce presentation.	Masterfully employs creative visual aids that enrich or reinforce presentation.				2	
P6	Content: Main Idea	No main idea is evident.	Presents a main idea with no connections to research or product.	Presents a main idea with adequate connection to research and product.	Presents an the effective main idea with strong and clear connections to research and product.	Presents an insightful main the idea with strong and clear connections to research and product.				3	
P7	Content: Organization	Does not employ an effective sequence.	Ineffectively sequences content.	Adequately employs a logical the sequence that the audience can follow.	Effectively employs a logical and engaging the sequence that the the audience can follow.	Masterfully employs a logical and engaging the sequence that the the audience can follow.				3	
P8	Content: Support	Does not demonstra*te use of supporting details.	Minimally demonstrates use of supporting details.	Adequately demonstrates use of supporting details.	Effectively demonstrates use of supporting details.	Masterfully demonstrates use of supporting details.				3	
P9	Self-Reflection	Does not reflect on process, successes, or challenges.	Reflects on The process, successes, and challenges with minimal insight.	Reflects on process, successes, and challenges with adequate insight.	Reflects on The process, successes, and challenges with effective insight and depth.	Reflects on The process, successes, and challenges with exceptional insight and depth.				2	
P10	Responses to Questions	Does not respond to questions.	Ineffectively responds to questions.	Politely responds to questions.	Politely, and Accurately responds to questions.	Confidentially, politely, and accurately responds to questions.				4	

Table 4.39 Rubric Design - Examination Panel Assessment for Report of Graduation Project 1 and 2.

ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $\frac{R \times W}{5}$
			1 Resubmission Necessary	2 Below Expectations	3 Meets Expectations	4 Above Expectations	5 Exceeds Expectations				
R1	Style and Format		Incomplete pages and improper format. Not follow the proposed guideline.	Preliminary pages are not as required. The improper caption of tables and figures. sometimes follow the guideline.	Preliminary pages are as required. The title of tables and figures can be improved. Generally follow guideline	Preliminary pages are as required. The tables and figures have the proper captions. Mostly follow guideline	Preliminary pages are as required. Tables and figures have the proper format and captions. Always follow guideline			2	
R2	Language (Spelling, Wording, Grammar)		The error on most pages and the level of writing is not accepted and need resubmit	Errors are serious and numerous. Reader must stop and reread and may struggle to discern the writer's intention. Multiple, serious errors.	Frequent errors that impede the flow of communication. Ok with <15 errors.	Occasional errors that have only minor impact on the flow of communication. Good with <10 errors	There are no errors that impair the flow of communication. Perfect with <5 errors			3	
R3	Information Literacy		No References or/and incorrect. No evidence of credible primary and secondary sources is	References are incomplete and incorrect. Rarely integrates credible primary or secondary sources.	References are given occasionally. Adequately integrates credible primary or secondary sources.	Adequate references are given. effectively integrates a variety of credible primary and secondary sources.	Complete references are given. Conscientiously and consistently integrates a variety of credible primary and secondary sources.			3	
R4	Citations		Does not demonstrate an understanding of how to use quotes, paraphrases, intext citations, or works cited.	Uses quotes, paraphrases, and in-text citations and follows most formatting rules for documentation and works cited.	Uses quotes, paraphrases, and in-text citations adequately and follows formatting rules for documentation and works cited.	Uses quotes, paraphrases, and in-text citations properly and follows formatting rules for documentation and works cited.	Uses quotes, paraphrases, and in-text citations in a refined manner and follows all formatting rules for documentation and works cited.			1	
R5	Organization		No progression of ideas is evident; does not use transitions.	Rarely provides a progression of ideas; rarely uses transitions.	Provides an adequate progression of related ideas with some transitions.	Provides an effective progression of related ideas with transitions.	Provides a sophisticated progression of related ideas with transitions.			2	

Continued Table 4.39 Rubric Design - Examination Panel Assessment for Report of Graduation Project 1 and 2.

Continued Table No. 3: Rubric Design – Examination I and Assessment for Report of Graduation Project I and II.														
ID	Scale Performance Criteria	Mark Scale and Guide							Row Mark (R)	Weight (W)	Final $R \times W$ 5			
			1 Resubmission Necessary	2 Below Expectations		3 Meets Expectations		4 Above Expectations					5 Exceeds Expectations	
R6	Contents and Creativity		The necessary and important material is not provided. Demonstrates no creative thinking, decision making, reasoning, and/or problem solving.	Material lacks the relevant content. Details lack a clear connection to the purpose. Everything seems as important as everything else. Demonstrates limited creative thinking, decision making, reasoning, and/or problem solving.		Material content is Appropriate. Some details are present to support the main idea. Some of the significant points are identified. Demonstrates Adequate creative thinking, decision making, reasoning, and/or problem solving.		Material content is clear and appropriate. Some details are present to support the main idea. Significant points are Identified. Demonstrates effective creative thinking, decision making, reasoning, and/or problem solving.		Material content is clear and concise. Accurate details are present to support the main idea. Significant points are well identified. Demonstrates sophisticated creative thinking, decision making, reasoning, and/or problem solving.			4	
R7	Testing, methodology and use of tools and software		Collecting improper data, and testing according to specified standard. No use of modern tool and techniques in the field	Collecting limited necessary data, and analysis few testing according to specified standard. Use of very limited modern tool and techniques in the field		Collecting some necessary data, and analysis some testing according to specified standard. Use of few modern tool and techniques in the field		Collecting most necessary data, analysis and most testing according to specified standard. Use of some modern tool and techniques in the field		Collecting all necessary data, and analysis all testing according to specified standard. Use of modern tool and techniques in the field			3	
R8	Design elements and component		Week and mistakes in design. donot follow standard codes and improper integration of design and no alternatives were provided	Conduct limited design according to standard codes and integrate design and no alternatives were provided		Conduct some design according to standard codes and integrate design and provides few alternatives		Conduct most design according to standard codes and integrate design and provide some alternatives		Conduct all design according to standard codes and integrate design and provide many alternatives			5	
R9	Ethics		Does not use ethical standard in producing an original product.	Minimally demonstrates use of ethical standards in producing an original product.		Adequately demonstrates use of ethical standards in producing an original product.		Effectively demonstrates use of ethical standards in producing an original product.		Consistently demonstrates sophisticated use of ethical standards in producing an original product.			2	
R10	Completeness and Accuracy		No description of the important outcomes	Incomplete, inaccurate description of important outcomes		Complete, inaccurate description of important outcomes		Incomplete, accurate description of important outcomes		Complete, accurate description of important outcomes			2	

Continuous Improvement Based on Indirect Assessment

Continuous Improvement Based on Student Survey

Figure 4.104 summarizes the results of indirect course survey for semester 1 and 2 year 2015-2016. The results of both semester 1 and semester 2 year 2015-2016 indicate that the SO attainment level exceeding the satisfaction base 60%. This very high level of attainment may be because the students believe that their opinion will affect their result and their grade in the course. Therefore an improvement action is needed to educate the student that this will help the instructors to improve the teaching process of the course and the students learning process will also improve if the students honestly explain their level of attainment. The response of students will not carry any effect on student's grade of the course. This could be implemented by requesting the student advising committee in the civil engineering program to conduct an open lecture for the students to raise their understanding level of the assessment process. In addition, requesting all teachers in civil engineering program to discuss this issue with the students in the first week each semester.

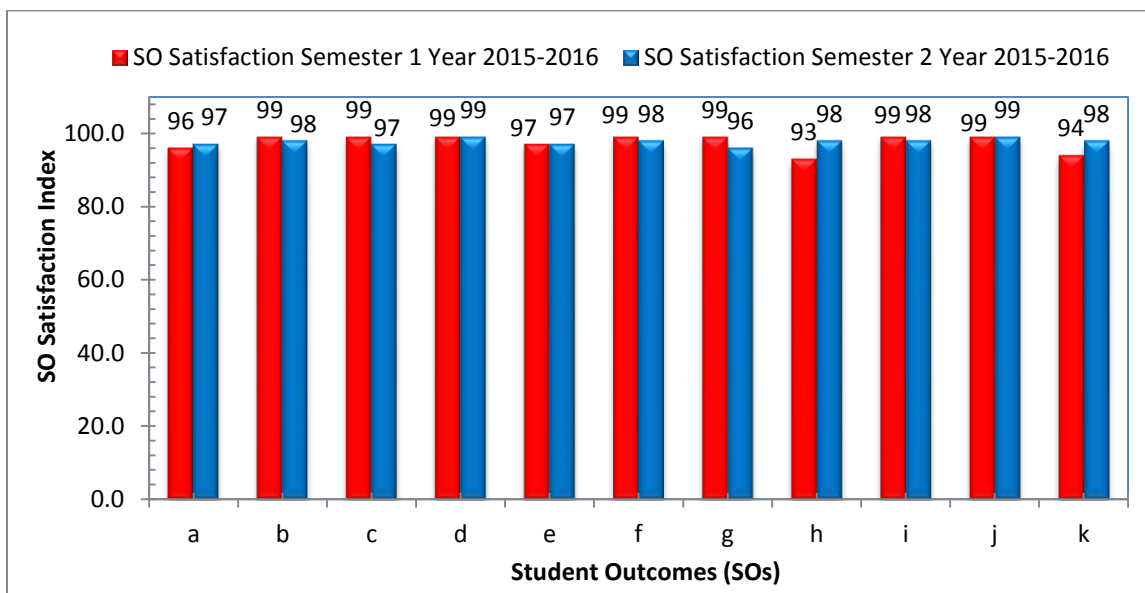


Figure 4.104: Comparison of SO attainment level based on Indirect Student Survey

Continuous Improvement Based on Exit Survey

Comparison between attainment level of SOs based on exit survey for both semester 1 and 2 is given in Figure 4.105. The results of both semester 1 and semester 2 year 2015-2016 indicate that the SO attainment level is exceeding the satisfaction base 60% for all SOs except for SO3 (c). In first semester 2015-2016, the satisfaction level of the outcome C which deals with the design based showed 57.5 % as shown in Figure 4.105 is less than the satisfaction criterion, 60%, the improvement plan were implemented in the second semester 2015-2016 by adding small design project in some subjects which lead to increase the satisfaction level up to 75 % . This

action plan will continue and will be made for all courses including design element starting from semester 1 year 2016-2017.

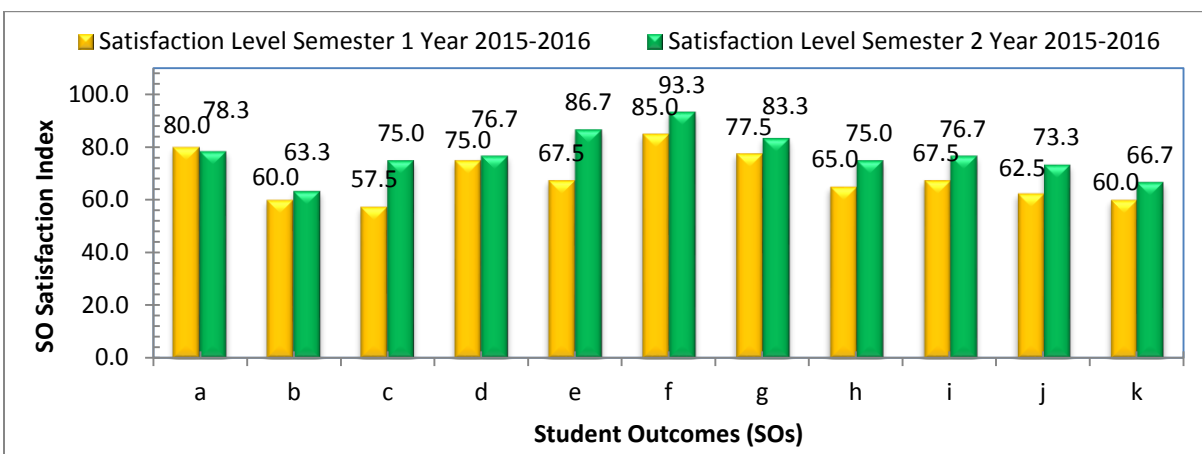


Figure 4.105 Comparison of SO attainment level based on indirect Exit Survey

Continuous Improvement Based on Faculty Survey

Comparison between attainment level of SOs based on Faculty Survey for both semester 1 and 2 year 2015-2016 is given in Figure 4.106. The results of both semester 1 and semester 2 year 2015-2016 indicate that the SO attainment level is exceeding the satisfaction base 60% for all SOs. No further improvement action is needed at this time based on this survey.

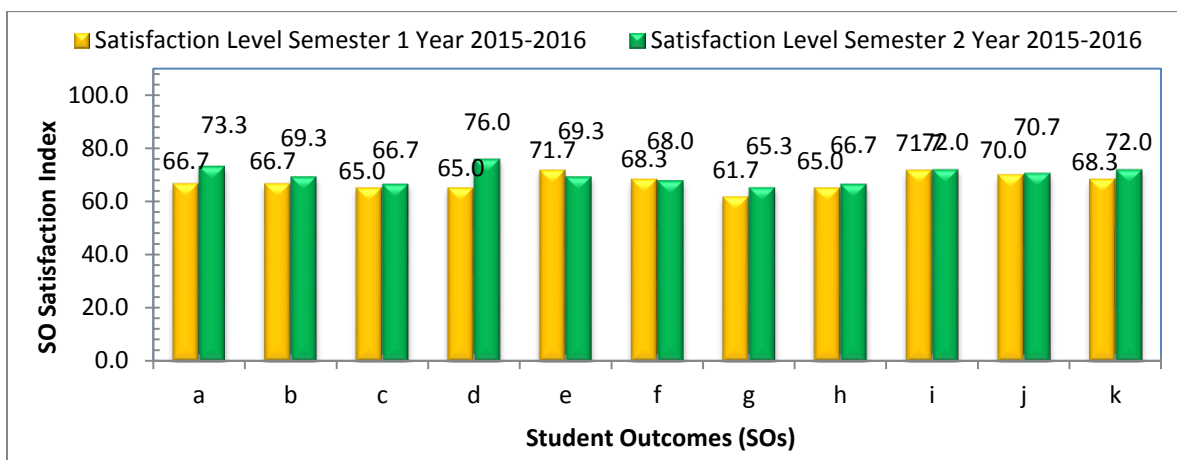


Figure 4.106 Comparison of SO attainment level based on Faculty Survey

Continuous Improvement Based on Alumni Survey

Comparison between attainment level of SOs based on Alumni Survey for both semester 1 and 2 year 2015-2016 is given in Figure 4.107. The results of both semester 1 and semester 2 year 2015-2016 indicate that the SO attainment level is exceeding the satisfaction base 60% for all

SOs. The need for further data is needed to draw a clear picture about the satisfaction level achieved based on the alumni survey since we decided to detail evaluation after collecting enough data from three years as stated in the assessment plan and frequency in the previous sections. No further improvement action is needed at this time based on this survey.

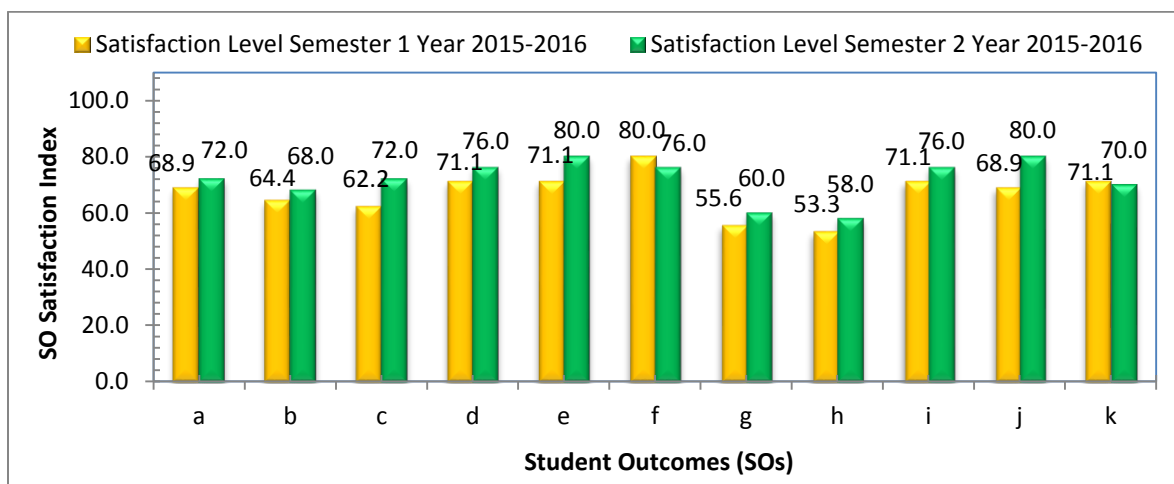


Figure 4.107 Comparison of SO attainment level based on Alumni Survey

Continuous Improvement Based on Employee Survey

Comparison between attainment level of SOs based on Employee Survey for both semester 1 and 2 year 2015-2016 is given in Figure 4.108. The results of both semester 1 and semester 2 year 2015-2016 indicate that the SO attainment level is exceeding the satisfaction base 60% for all SOs. The need for further data is needed to draw a clear picture about the satisfaction level achieved based on the alumni survey since we decided to detail evaluation after collecting enough data from three years as stated in the assessment plan and frequency in the previous sections. No further improvement action is needed at this time based on this survey.

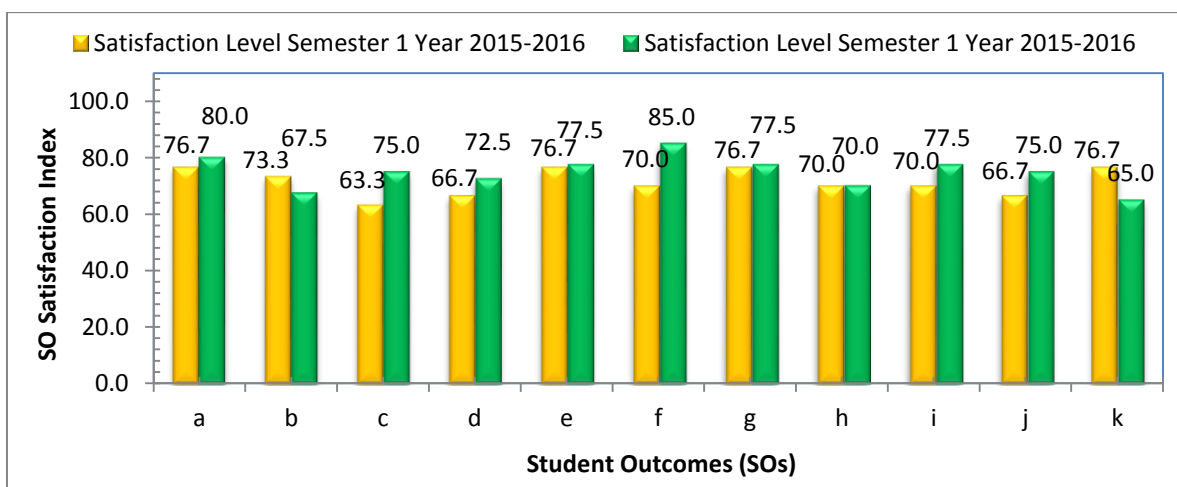


Figure 4.108 Comparison of SO attainment level based on Employee Survey

Continuous Improvement Based on Course Readiness

CLOSO software provides the opportunity to the instructors to voice their concerns about the “Course Readiness”. It involves the readiness aspects required at the beginning of the semester. In course readiness, the instructors could response to 18 aspects including pre-requisite course, pre-requisite abilities of the students, textbook, etc. The results of all these 18 aspects for semester 1 and semester 2 year 2015-2016 are shown in Figures 4.50 and 4.51 respectively.

The results of course readiness for semester 1 year 2015-2016 shows that out of 24 courses included in the assessment and evaluation process about 6 courses the instructors not a response to most of the 18 aspects. This lack of response forms about 25% from courses included in the assessment. This is high percentage hide the instructors opinions to improve many aspects and issues of the program.

To overcome this lack of response, a workshop for training the staff in civil engineering was conducted at the beginning of the second semester 2015-2016. This workshop covers the use of CLOSO software and how to make a complete assessment using all available responses that the instructor could provide and suggested in every aspect. All civil engineering staff was attending this workshop.

At the end of semester 2 year 2015-2016, the summary of the instructor’s responses for course readiness listed in Table 4.51 shows that the number of courses including in the assessment was 26 courses while it was 24 in semester 1. In addition, the number of instructors did not a response to the 18 aspects was vary from zero to two instructors. This means about 92% to 100% of the instructors which higher than the responses of the first semester where only 75% of the instructors responses was recorded.

The proposed workshop as continuous improvement action was effective in providing more improvement from the instructors. This also indicates that the faculty members improve their understanding and performing of the assessment plan and methods for the program. This lead to adopting to perform this workshop at the beginning of each semester especially for the new staff joining the program.

Table 4.40: Comparison of Pre-requisite Using Course Learning Readiness

Semester 1 Year 2015-2016					
S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
1	Pre-Requisite Courses	Response	18	Appropriate	13
				Inappropriate	5
		No Response	6	No Response	6
Total responses			24	Total	24
Semester 1 Year 2015-2016					
S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
1	Pre-Requisite Courses	Response	26	Appropriate	16
				Inappropriate	10
		No Response	0	No Response	0
Total responses			26	Total	26

Table 4.41 Comparison of Pre-Requisite Abilities Using Course Learning Readiness

Semester 1 Year 2015-2016					
S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
2	Pre-Requisite Abilities	Response	18	Appropriate	11
				Inappropriate	4
				Very Poor	3
		No Response	6	No Response	6
Total responses			24	Total	24
Semester 1 Year 2015-2016					
S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
2	Pre-Requisite Abilities	Response	26	Appropriate	13
				Inappropriate	12
				Very Poor	1
		No Response	0	No Response	0
Total responses			26	Total	26

Table 4.42 Comparison of Textbook Availability Using Course Learning Readiness.

Semester 1 Year 2015-2016					
S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
13	Textbook Availability	Response	18	From Institution	8
				From Local Book	4
				From Overseas Book	0
				From Internet	3
				Difficult to Find	2
				Not Available	1
				Not Applicable	0
		No Response	6	No Response	6
Total responses			24	Total	24
Semester 1 Year 2015-2016					
S/N	Aspects of Readiness	Action	(Number)	Opinions	(Number)
13	Textbook Availability	Response	26	From Institution	21
				From Local Book	2
				From Overseas Book	0
				From Internet	2
				Difficult to Find	0
				Not Available	0
				Not Applicable	0
		No Response	0	No Response	0
Total responses			26	Total	26

Continuous Improvement Based on CE-IAC and External Examiners

The feedback from CE-IAC and external examiner discussed in sections A.6 and A.7 such as the following:

- (a). Adding new course such as Quantity surveying and estimating course as this course was not offered in our current curriculum
- (b). Separating the labs from the course in all course contains laboratory experiments
- (c). Adding elective courses in all areas of civil engineering
- (d). Modified the content of some courses by adding or deleting them in the new curriculum which will be implemented next year

The civil engineering council responded to the above issues and asked the curriculum committee to establish a modified new curriculum taking into account all the above matters and incorporate the feedback received from the report of the external examiner and civil engineering advisory council. The committee proposed a modified curriculum and reviewed several times by the input from all staff from the program. The program council has been approved the new proposal and further steps in progress for approval from the institution.

Continuous Improvement for Assessment Plan, Assessment Methods and Tools

One of the strength points in the continuous improvement of civil engineering program is the evaluation of the assessment plan, assessment frequencies, tools used in the assessments and the assessment methods. The evaluation of these issues outstanding improvement of the program could be achieved. Examples of the previous and current year review and continuous improvement implemented for assessment plan, assessment frequencies, tools used in the assessments are explained in the following sections.

Samples of Previous Years Continuous Improvement

The discussion of the assessment plan, assessment frequency, and assessment tools in the civil engineering program council some issues were raised during last two years. Among these issues are the following:

- (1). The time needed for the assessment plan from the instructor is so huge. The analysis and evaluation of the result of assessment are also very time-consuming and tedious. An improvement is needed to cut down the time and work needed from the civil engineering staff to complete their tasks on time and save more time to be used in quality of teaching and research activity.
- (2). Manual processing of assessment and results and even the excel template used to save some time and effort are not efficient. Continue using manual and excel sheets and template alone need dedicated significant time from our staff.
- (3). Sample courses and data even it is accepted by many accreditation organization (such as national accreditation –NCAAA- and ABET accreditation) and used by several

engineering programs worldwide does not provide a complete picture of the level of attainment of our student for SOs and it may not provide more details where some weak points are hidden and efficient and complete improvement plan is needed.

- (4). Since civil engineering program and college of engineering are relatively new established, a limited expert in quality control of engineering education, outcome-based education, and accreditation criteria may be available among our staff. In addition, the need for external views and opinions from experts not work in developing the curriculum and plan the assessment and perform all tasks in teaching and learning process may also need.
- (5). External views from external academic from established engineering colleges may help to form a kind of benchmarking of our program with another high-quality program.

As a response from the civil engineering program administration, new steps were taken as a continuous improvement plan. These steps were start implemented from the last year 2014-2015 and beginning of this year 2015-2016. These steps include:

- (1). A CLOSO software was purchased and licensed for all engineering programs in Najran University including civil engineering program. The CLOSO software package marketed by www.smart-accredit.com. The use of CLOSO software dramatically improved the assessment tools and frequency software. Benefits and improvements provided from using CLOSO software could be listed in the following:
 - (a). Cut down the instructor's time and effort in preparing the course file and data collection.
 - (b). Increase the reliability of the collected data.
 - (c). Allow error-free processing of a large amount of data and thus enable the department to analyze and evaluate all courses within a week after obtaining the data files from the instructors.
 - (d). Obtain faculty's opinions on a number of issues that may help improve the CLO and SO attainments.
 - (e). Identify any course that has an issue and to take corrective measures.
 - (f). Enable the chairman of the department, the ABET coordinator to re-view the SO attainments and "Loop-closing" in each semester.
 - (g). Maintain a unified database for syllabi of all courses.
 - (h). Make the assessment and evaluation system highly sustainable.
- (2). Two external examiners and advisors from overseas experts are assigned. The external examiners will visit our program once a year and review all teaching and learn processes, facilities, curriculum and provide advice and detail report stated strength and weak points which help the program to the response by an action plan for improvement of the issues raised by their report and visit.

Samples of Current Continuous Improvement

The discussion of the assessment plan, assessment frequency, and assessment tools in the civil engineering program council some issues was raised after evaluation of results of assessment first and second semesters in this year 2015-2016. Among these issues and the suggested corresponding continuous improvement actions are the following:

- (1). Because the student outcomes (SOs) and courses learning outcomes (CLOs) are written in standard and limited numbers, focus look to the detail week points may not be addressed in proper way and format. Therefore, a breakdown of the both SOs and CLOs into sub-outcomes called performance indicators could provide a more detail where the improvement action is needed. This type of improvement may be conducted through three to four sub-outcomes or performance indicators.
- (2). Variations and inconsistent of assessment marks performed by different staff for the same CLO or SO may lead to fault results and may provide inappropriate improvements actions. This issue need moderate the marks between staff. This could be obtained by using a rubric to guide the instructor to distribute the marks into performance indicators that measure the performance of the outcomes and provide a clear defined scale for each performance indicators. This improvement action will start in the next semester by requesting the instructor of each course to establish at least one rubric for one assessment method used in that course. In addition, a workshop about types of rubric and rubric design for all staff in the program will be organized next semester (semester 1, 2016-2017). The following semesters the assessment committee will review selected rubrics and standardized it in order to be used for certain SOs and or CLOs of selected courses.
- (3). To date, all courses included in the assessment plan and evaluation is limited to courses from civil engineering core courses and some of the core general engineering courses. All courses of math and basic sciences are not included. The civil engineering council takes a decision to try to include these math and science courses in assessment and provide continuous improvement plan. A new committee is formed to arrange invite selected staff teaching some course from the college of science and art and train them for using CLOSO software and try to assess the courses they taught from civil engineering curriculum in order to include these courses in our assessment plan. This may start with two courses in next semester and evaluate the result and problems in this action for further improvement.