

**I. Students Learning Assessment – student learning outcomes, assessment tools, analyses and action plans**

The assessment methods are described in the quality improvement plan. Table 1 summarizes how the SLOs were assessed and the actions taken to address any concerns.

Table 1: Results of 2020 SLO Assessment

2020 Baseline SLO Assessment					
Student Learning Outcomes	Courses + Surveys	Two Measures (Direct or Indirect)	Meet, Above or Below Threshold (70%)	2020 Performance (≥ 70%) Or Alumni Employer Survey (Mean %)	Actions to be taken based on Instructor’s Assessment (See last few pages of each SLO)
<i>1. Create written communications appropriate to the construction discipline.</i>	CM&E 203	Final Project (Direct)	Final Project Y (>70)	93	Replace multiple-choice questions with analyzing questions
	CM&E 453	Assignments 3, 4, 5, Exam 1, and Final Exam (Direct)	Assignment 3 Y (>70)	70	An active class work approach will be used in this course to further extend what was started in the last offering of the course. Several active class work will be used and assessed as part of the pedagogy of the course. The course will be is section should be used to fully describe specific actions to be taken to address the course. There will be individual as well group work in the classroom.
	Survey Question Related to SLO1	SLO1 Results from Survey (Indirect)	Y (>70)	86.9	
<i>2. Create oral presentation</i>	CM&E 203	Final Project (Direct)	Final Project Y (>70)	93	Replace multiple-choice questions with analyzing questions

<i>s appropriate to the construction discipline</i>	CM&E 240	Investment game project (Direct)	Investment game project Y (>70)	92.3	Study habits may also be partly involved, but additional more focused classes in this area (SLO 2) might be able to further strengthen these areas. Attendance may be added.
	Survey Question Related to SLO2	SLO2 Results from Survey (Indirect)	Y (>70)	85.4	
<b>3. Create a construction project safety plan</b>	CM&E 405/605	Assignment # 3 (Direct)	Assignment # 3 Y (>70)	90	Study habits may also be partly involved, but additional more focused classes in this area might be able to further strengthen these areas
	CM&E 488	Group project (Direct)	Group project Y (>70)	97.5	97.5% of CM majors achieved expected performance result of 70% performance, showing an excellent student learning outcome. This means the instructions level was appropriate. One student did not turn in this quiz. However, an improvement on student learning is still expected.  Create a high-level grading criterion
	Survey Question Related to SLO3	SLO3 Results from Survey (Indirect)	Y (>70)	76.2	
<b>4. Create construction project cost estimates.</b>	CM&E 380	Assignment # 5, Exam # 2 (Direct)	Exam # 2 Y (>70)	100	In the subsequent offerings, additional lectures on highway cost estimation will be added to the syllabus to provide the necessary skills and knowledge in estimating highway construction costs.  Students will be introduced to additional software and tools including Revit, building

					information modeling (BIM) to enable them to gain the skills for 3-D cost estimation
	Survey Question Related to SLO4	SLO4 Results from Survey (Indirect)	Y (>70)	79.2	
<b>5. Create construction project schedules</b>	CM&E 403	Assignment # 1, 5 (Direct)	Assignment # 1 Y (>70)	88	Create an enhanced grading criterion
	Survey Question Related to SLO5	SLO5 Results from Survey (Indirect)	Y (>70)	83.1	
<b>6. Analyze professional decisions based on ethical principles</b>	CM&E 450	Assignment # 5 (Direct)	Assignment # 5 Y (>70)	96.3	Study habits may also be partly involved but additional more focused classes in this area might be able to further strengthen these areas. Attendance may be added.
	CM&E 453	Assignment # 3	Assignment # 3 Y (>70)	90	Proposal to provide more time for students to understand concepts and reduce workload for students within the semester.
	Survey Question Related to SLO6	SLO6 Results from Survey (Indirect)	Y (>70)	91.5	
<b>7. Analyze construction documents for planning and management of</b>	CM&E 200	Worksheet # 1 (Direct)	Worksheet # 1 (Grade Dist.) Y (>70)	83.3	1. We will continue to use the group worksheets in the class, continue the short quizzes. Update worksheets as required to assess new material introduced in lectures. Begin collecting examples to help explain and clarify

<i>construction processes</i>					<p>construction procedures and material identification.</p> <p>2. Ask industry members to provide “testimonies” of the importance of reading and understanding construction documents.</p> <p>3. “Rethink” quiz questions to reinforce the link between specifications and construction documents</p> <p>4. I will continue to research textbooks.</p> <p>5. I will continue to introduce BIM philosophy, technology, and terminology in future course offerings. I will adjust worksheet questions accordingly.</p> <p>6. Restructure lectures and increase clarity of assignment expectations.</p>
	Survey Question Related to SLO7	SLO7 Results from Survey (Indirect)	Y (>70)	90	
<i>8. Analyze methods, materials, and equipment used to construct projects</i>	CM&E 301	Assignment # 5 (Direct)	Assignment # 5 Y (>70)	98	<p>Examination 2 material will be revisited, and additional work will be designed around examination to address the problem.</p> <p>Soils and engineering economics – will be revised to enable students apply them in this course.</p>
	CM&E 453	Assignment # 4 (Direct)	Assignment # 4 Y (>70)	96	<p>An active class work approach will be used in this course to further extend what was started in the last offering of the course. Several active class work will be used and assessed</p>

					as part of the pedagogy of the course. The course will be is section should be used to fully describe specific actions to be taken to address the course. There will be individual as well group work in the classroom.
	Survey Question Related to SLO8	SLO8 Results from Survey (Indirect)	Y (>70)	81.8	
<b>9. Apply construction management skills as a member of a multi-disciplinary</b>	CM&E 488	Group project (Direct)	Group project Y (>70)	50	Spend more class time on helping students to prepare the exam Create a high-level grading criterion
	Survey Question Related to SLO9	SLO9 Results from Survey (Indirect)	Y (>70)	89.2	
<b>10. Apply electronic-based technology to manage the construction process.</b>	CM&E 204	Lab Assignment # 6 (Direct)	Lab Assignment # 6 Y (>70)	98	The next course would be to better align the course objectives and learning outcomes with the assessments. Also, more virtual interaction would be beneficial to the students to strengthen their learning of the material.
	CM&E 212	Assignment # 8	Assignment # 8 Y (>70)	76.9	Continuous monitoring of the student's participation will be performed, and necessary course improvements will be followed. Additionally, after the COVID-19, the final project will still be used as one of the assessment tools.
	Survey Question	SLO10 Results from	Y (>70)	81.3	

	Related to SLO10	Survey (Indirect)			
<b>11. Apply basic surveying techniques for construction layout and control.</b>	CM&E 204	Lab Assignment # 3 (Direct)	Lab Assignment # 3 Y (>70)	90	The performance of students on Assignment #4 Question 1 (horizontal curve layout) and Assignment #5 Question 2 (coordinate method/average end area method) was less than satisfactory. Additional examples and assignments on these topics will strengthen student performance.
	Survey Question Related to SLO11	SLO11 Results from Survey (Indirect)	Y (>70)	81	
<b>12. Understand different methods of project delivery and the roles and responsibilities of all consistencies involved in the design and construction process.</b>	CM&E 431	Assignment # 2: Questions 1 to 5. (Direct)	Assignment # 2: Questions 1 to 5 Y (>70)	94	After the COVID-19, the final project (real LEED project) will be still used as one of the assessment tools to foster student engagement and group work. More challenging activities and classwork would be developed and added. I am going to continue to bring industry expert(s) to the class and increase the opportunities for site visits for students.
	Survey Question Related to SLO12	SLO12 Results from Survey (Indirect)	Y (>70)	87.2	
<b>13. Understand construction risk management .</b>	CM&E 403	In-class Activity 5 (Direct)	Y (>70)	100	More hands-on instructions and assignments focused on project control needs to be introduced for students for the future semesters.
	Survey Question	SLO13 Results	Y (>70)	84.6	

	n Related to SLO13	from Survey (Indirect)			
<b>14. Understand construction accounting and cost control.</b>	CM&E 240	Assignment # 3 / Quiz #1 (Direct)	Assignment # 3 Y (>70)	95.4	The requirements of the assignments and its grading criteria could be modified to a higher level to enhance student learning.
	Survey Question Related to SLO14	SLO14 Results from Survey (Indirect)	Y (>70)	79.7	
<b>15. Understand construction quality assurance and control.</b>	CM&E 405/605	Assignment # 1, 5 (Direct)	Assignment # 5 Y (>70)	90	Additional more focused classes in this area (SLO 15) might be able to further strengthen these areas
	Survey Question Related to SLO15	SLO15 Results from Survey (Indirect)	Y (>70)	85.6	
<b>16. Understand construction project control processes.</b>	CM&E 305	Exam 3 (Question 23,28) Final Exam (Question 10,26,28,77), Assignment # 3 (Direct)	Exam (Question 10,26,28,77) Y (>70)	57	Additional focused classes in this area (SLO 16) might be able to further strengthen these areas
	Survey Question Related to SLO16	SLO16 Results from Survey (Indirect)	Y (>70)	85.1	

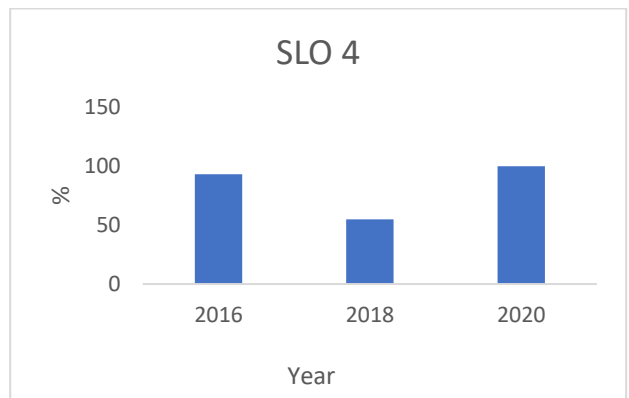
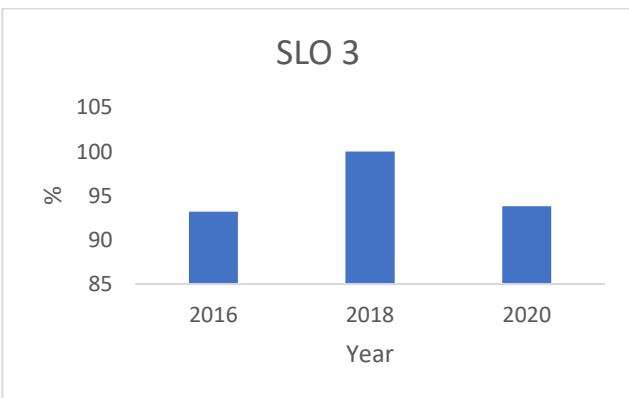
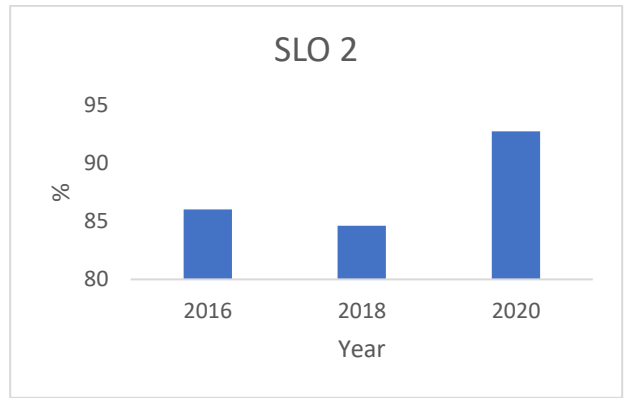
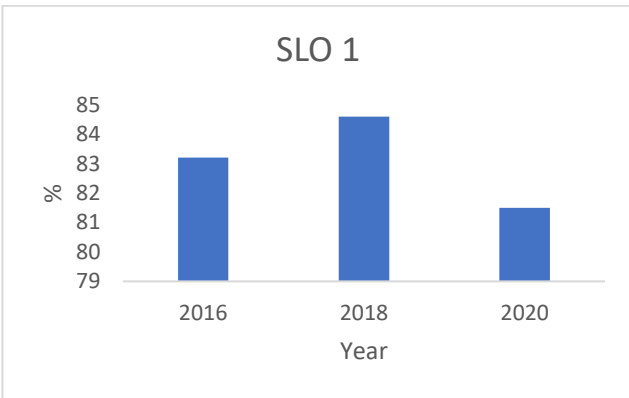
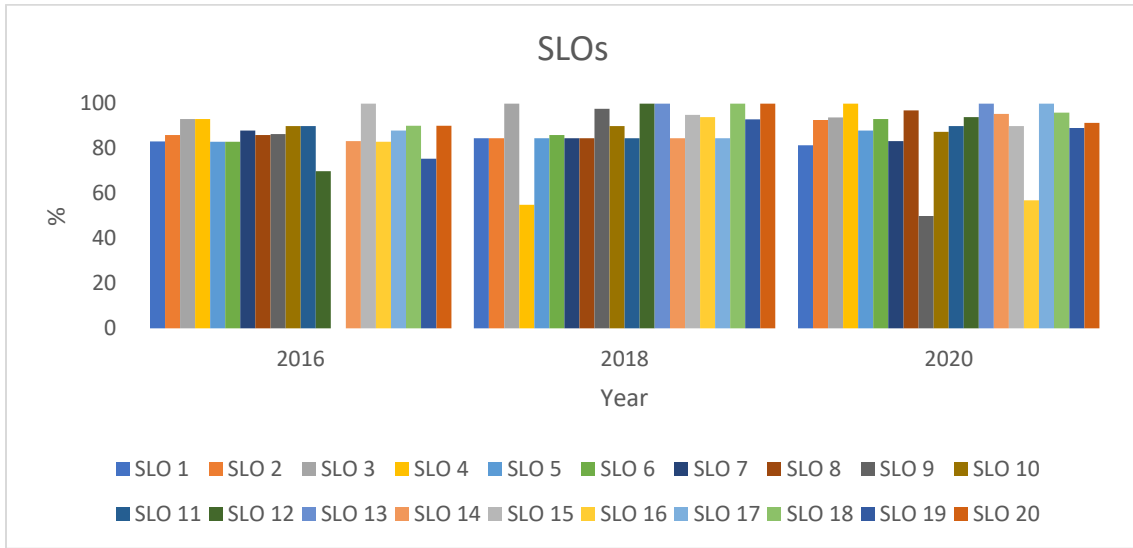
<b>17.</b> <i>Understand the legal implications of contract, common, and regulatory law to manage a construction project.</i>	CM&E 430	Final project (Direct)	Final project Y (>70)	100	
	Survey Question Related to SLO17	SLO17 Results from Survey (Indirect)	Y (>70)	84.6	
<b>18.</b> <i>Understand the basic principles of sustainable construction.</i>	CM&E 301	Assignment # 5 (Direct)	Assignment # 5 Y (>70)	98	Examination 2 material will be revisited, and additional work will be designed around examination to address the problem.  Soils and engineering economics – will be revised to enable students apply them in this course.
	CM&E 431	Assignment 5: Q1 to 15, Assignment 2: Q1 to 5 (Direct)	Assignment 2: Q1 to 5 Y (>70)	94	After the COVID-19, the final project (real LEED project) will be still used as one of the assessment tools to foster student engagement and group work. More challenging activities and classwork would be developed and added. I am going to continue to bring industry expert(s) to the class and increase the opportunities for site visits for students.
	Survey Question Related to SLO18	SLO18 Results from Survey (Indirect)	Y (>70)	84.9	
<b>19.</b> <i>Understand the basic principles of</i>	CM&E 250	Assignment #3, Exam 1 (Direct)	Exam 1 Y (>70)	86.3	It was also observed that about 90% or more of the students were struggling with math skills and using the mathematical equations was a

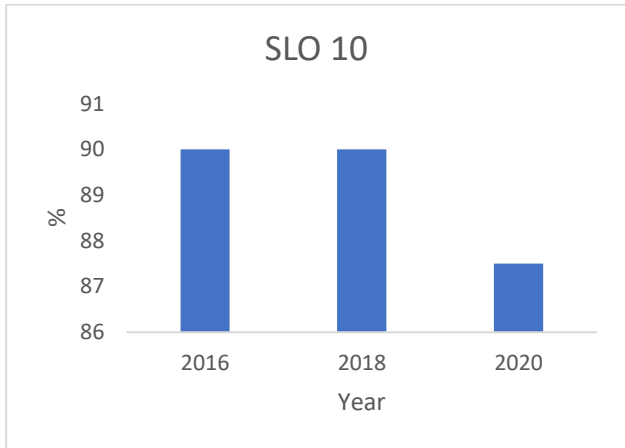
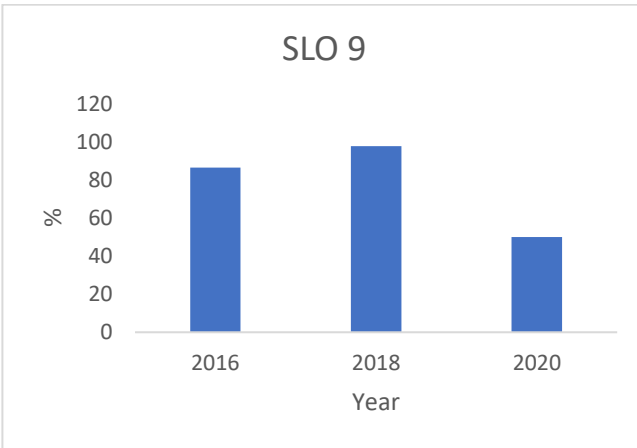
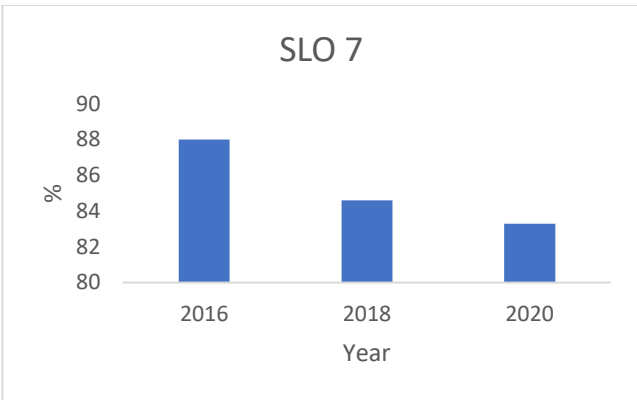
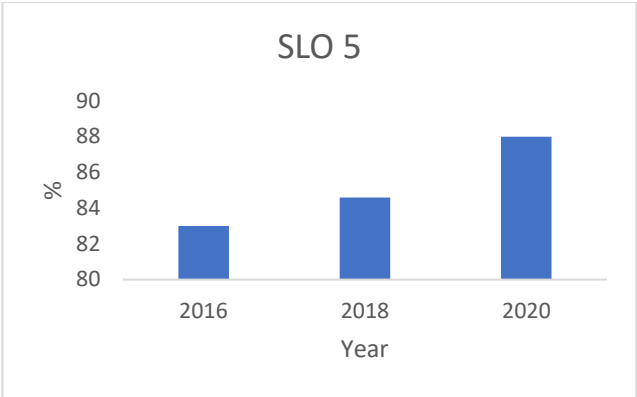


<i>structural behavior.</i>					challenge to them. Students will be introduced to the requisite math skills and tested on them in the next offering of the course.
	CM&E 450	Assignment # 1-5 (Direct)	Assignment # 3 Y (>70)	94	<p>1. match more from example solutions to problems in student assignments. More hands-on examples on class.</p> <p>2. previous issue still exists - CME 250 materials are not retained and carried into CME 450. Most students were grasping at fundamental concepts such as loads.</p> <p>3. may challenge student more once pandemic is over.</p>
	Survey Question Related to SLO19	SLO19 Results from Survey (Indirect)	Y (>70)	84.4	
<b>20.</b> <i>Understand the basic principles of mechanical, electrical, and piping systems</i>	CM&E 421	Assignment #1 (Direct)	Assignment #1 Y (>70)	92	COVID-19 limits the ways to effectively deliver knowledge to students and then assess their performance (including online classes and online exams). The instructor needed to modify the class delivery method to adapt to it. That is why some of students felt this course was relatively easy (see Student Feedback). After the COVID-19, the final project and site visit reports will be still used as the assessment tools of this course to foster student engagement and group work. More challenging activities and classwork would be developed and added. I am going to continue to bring

					industry expert(s) to the class for students.
	CM&E 431	Final Exam (Section B - (2), (3), (6), (9), (14), (15), (20).) (Direct)	Final Exam (Section B - (2), (3), (6), (9), (14), (15), (20).) (Direct) Y (>70)	90.7	COVID-19 limits the ways to effectively deliver knowledge to students and then assess their performance (including online classes and online exams). The instructor needed to modify the class delivery method to adapt to it. That is why some of students felt this course was relatively easy (see Student Feedback). After the COVID-19, the final project (real LEED project) will be still used as one of the assessment tools to foster student engagement and group work. More challenging activities and classwork would be developed and added. I am going to continue to bring industry expert(s) to the class and increase the opportunities for site visits for students.
	Survey Question Related to SLO20	SLO20 Results from Survey (Indirect)	Y (>70)	79.7	

Figure 1 represents the SLOs assessment results for the comprehensive assessment periods (2016, 2018 and 2020).





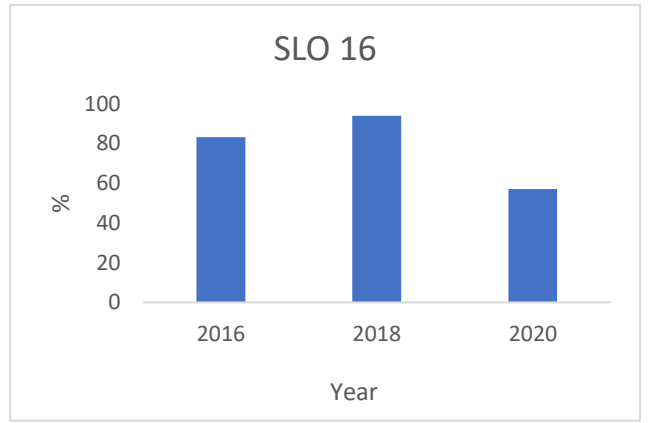
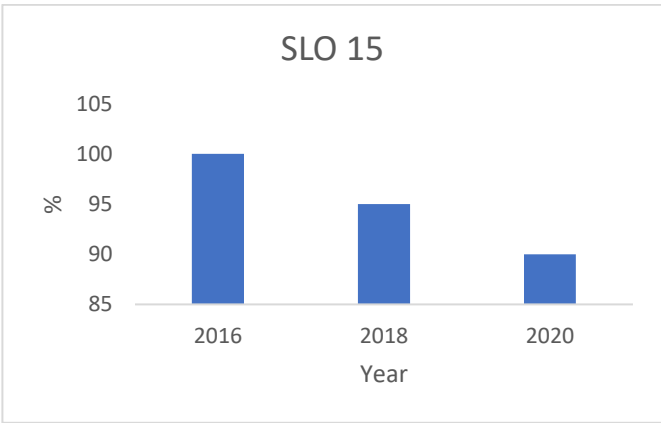
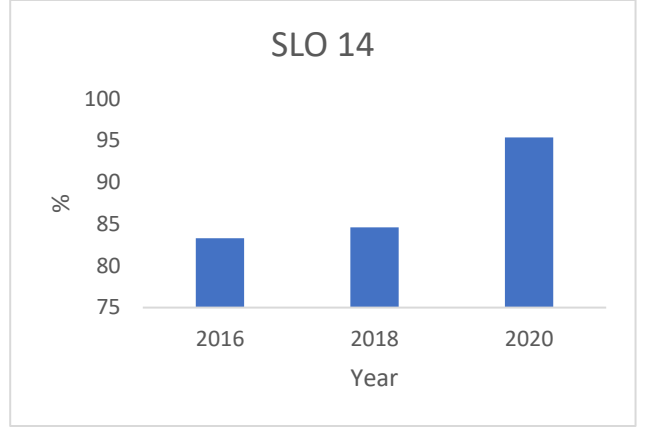
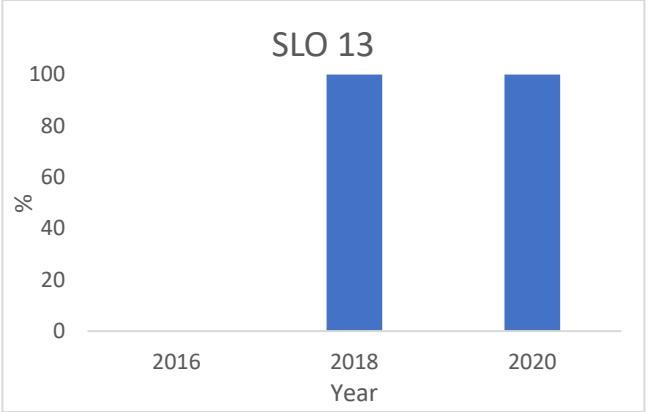
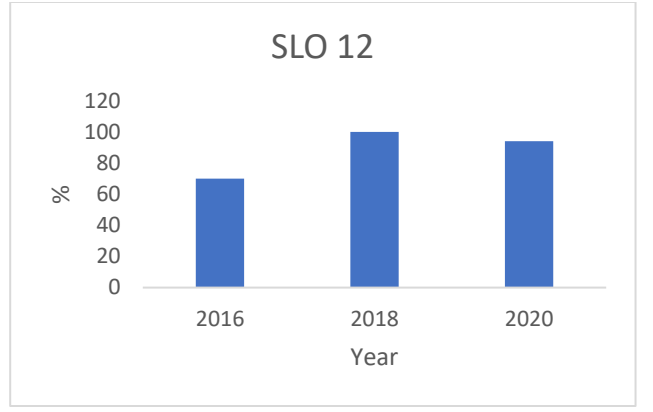
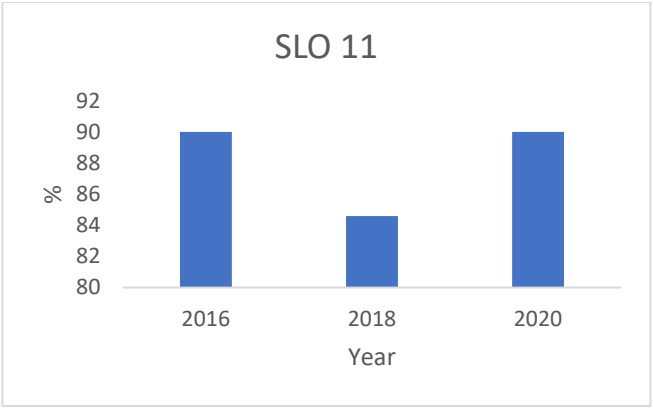




Figure 1: Histogram of All 20 SLOs.

The variation in the SLOs using 2016 as the base year is depicted in Figure 2. Natural events (onset of COVID-19, the resignations of course professors and others) and departmental actions (introduction of courses, the assignment of courses to new or different professors) might account for the changes. Most of the changes have positive values but a few have negative values and these changes may follow a random walk. Thus, the results of actions taken in the courses/curriculum cannot be fully anticipated or predicted.

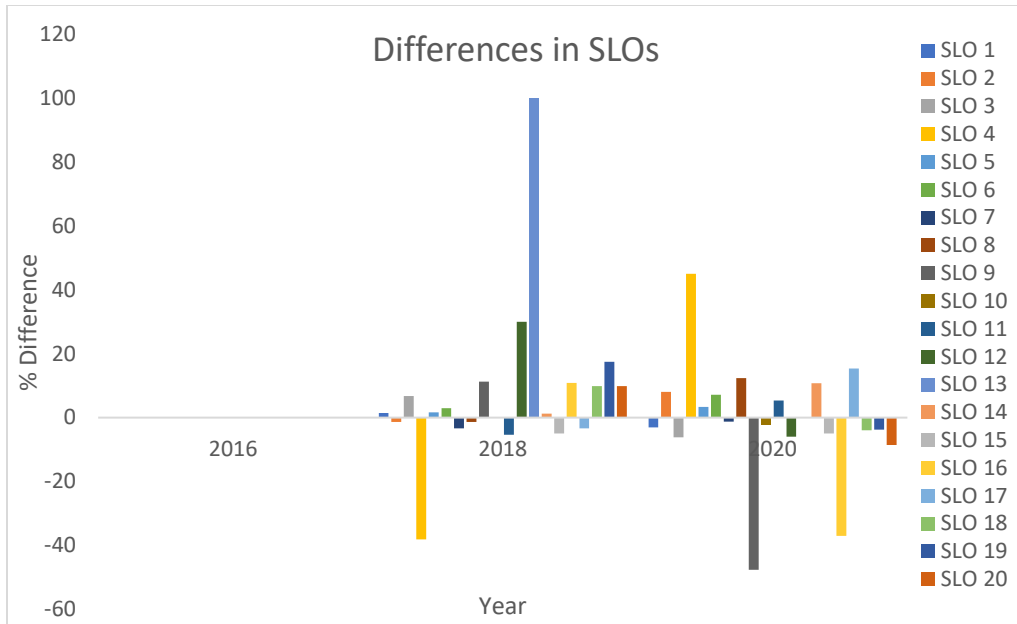
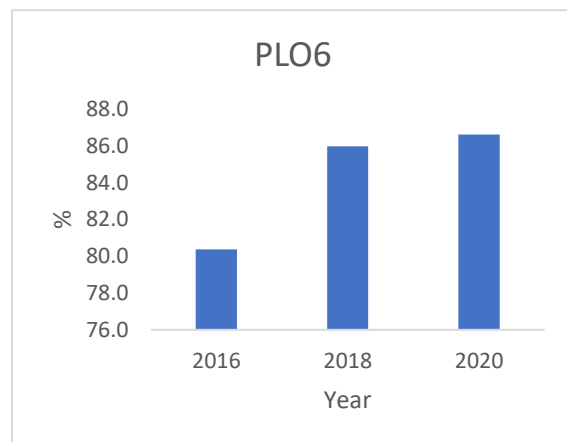
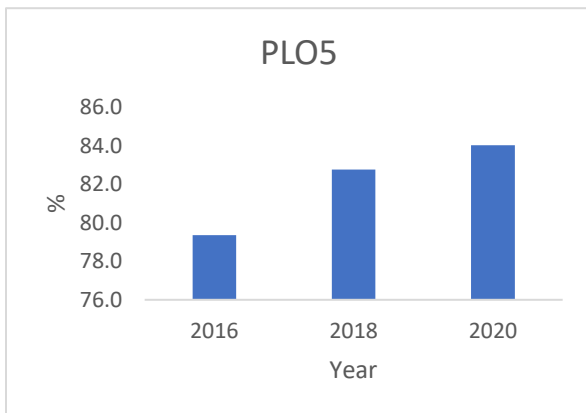
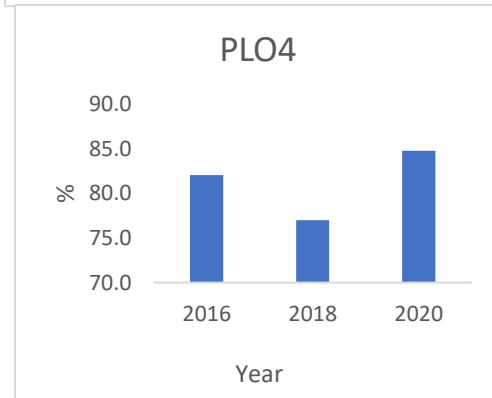
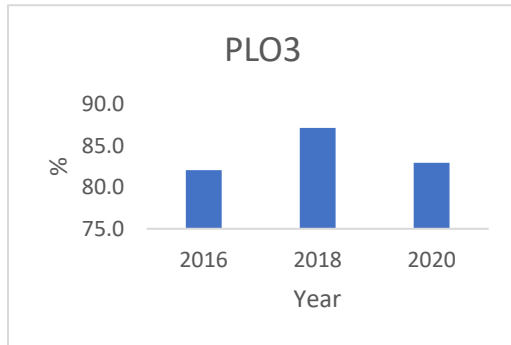
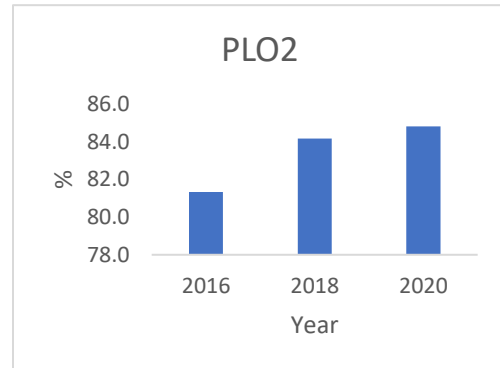
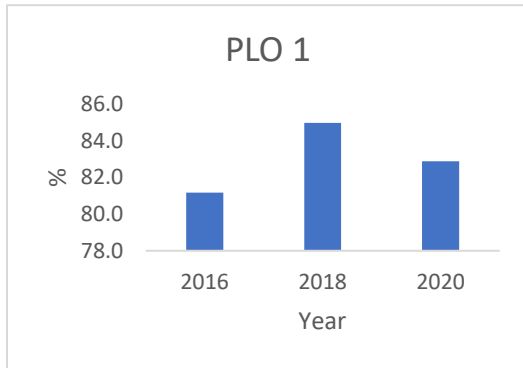


Figure 2: Histogram of Changes in SLOs.

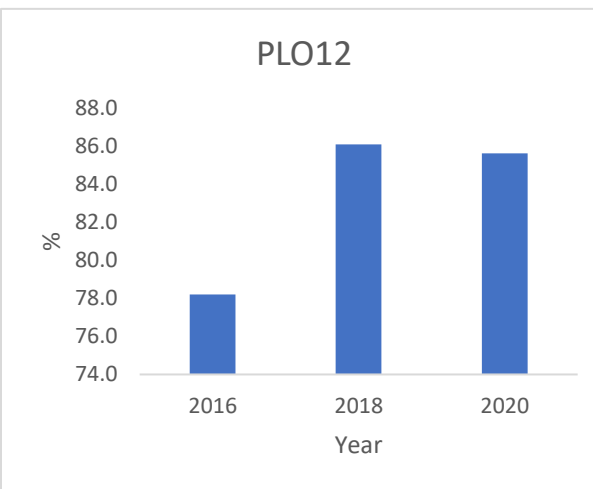
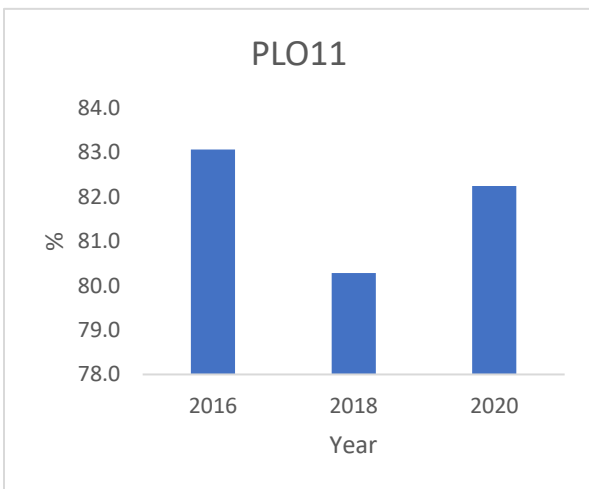
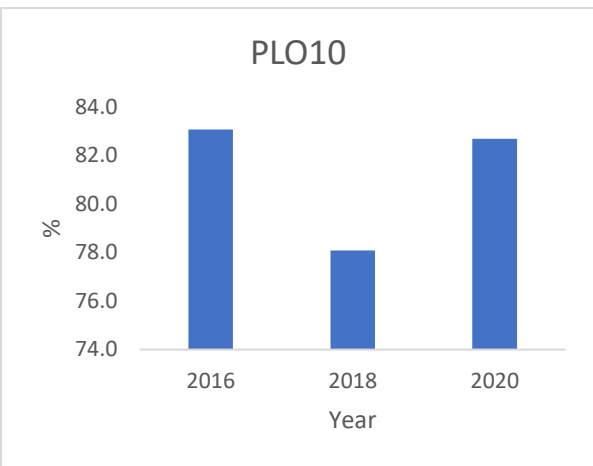
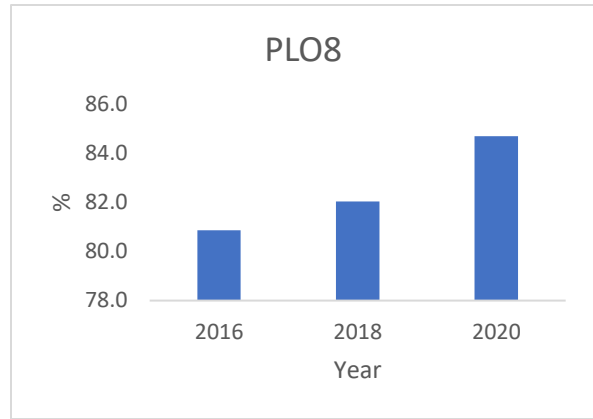
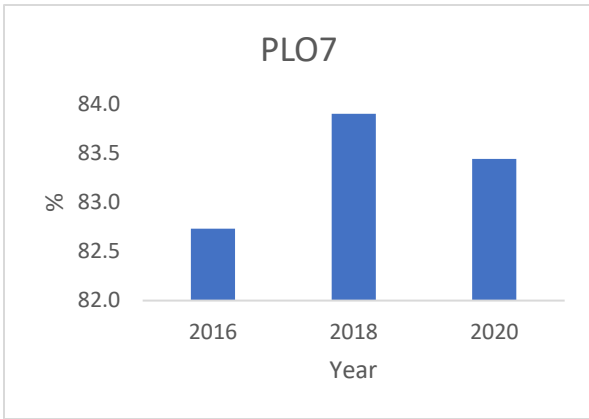
## II. Program Assessment Measures –program learning outcomes, degree program outcomes, assessment, analyses of results and action plans.

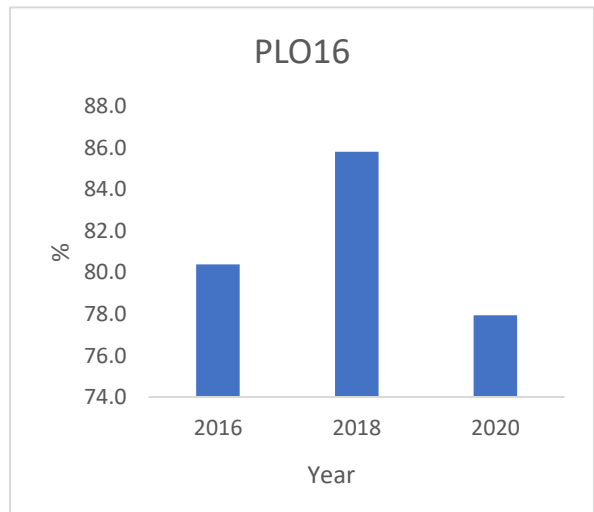
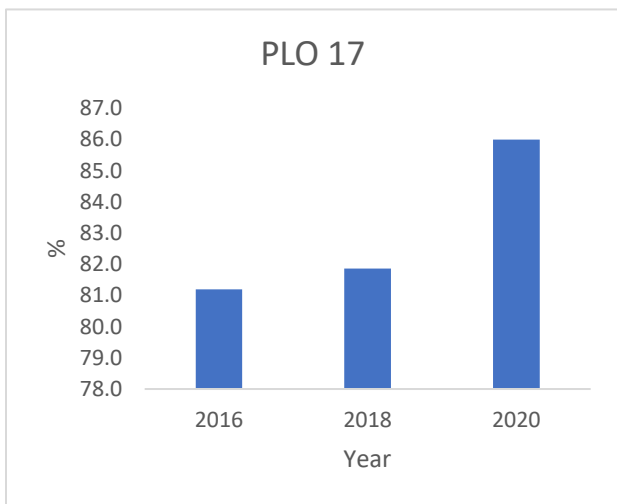
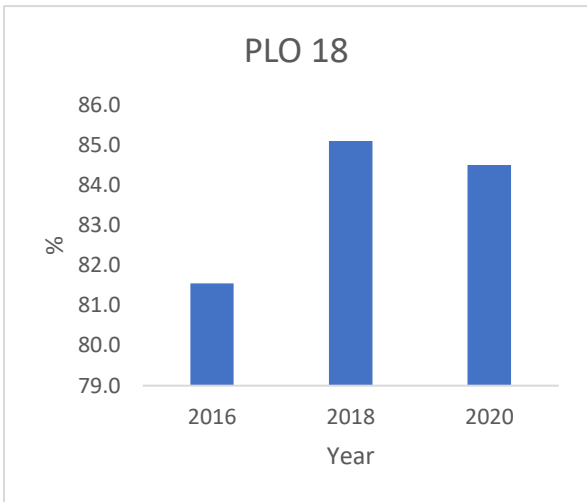
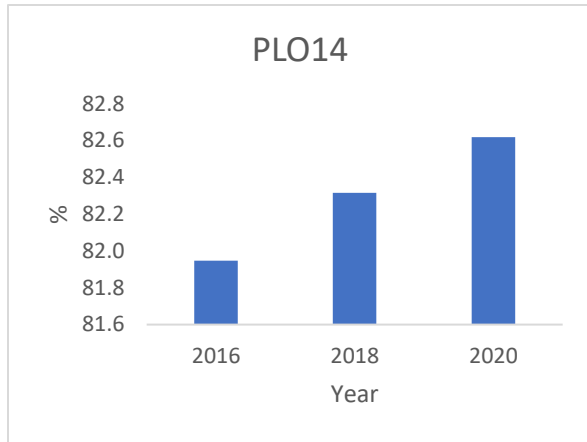
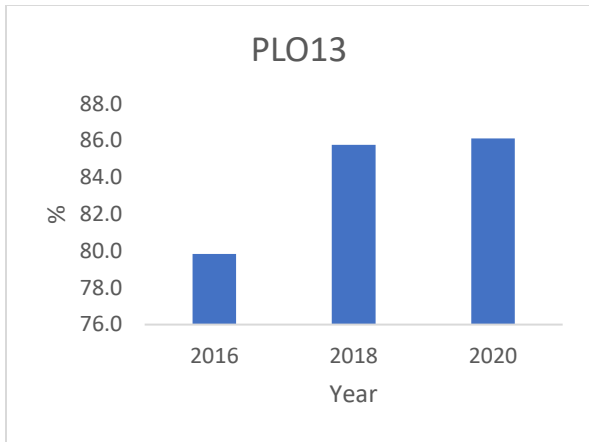
The comprehensive assessment cycle covered 2016, 2018 and 2020. All the 20 program learning outcomes (PLOs) and the five degree program outcomes or degree program outcomes (POs) were reviewed. The assessment of the PLOs and POs (or PDOs) are described in the quality improvement plan. Figures 3 and 4 represent the PLOs and the changes in the PLOs in the period of the review, respectively.

### Analyses of PLOs









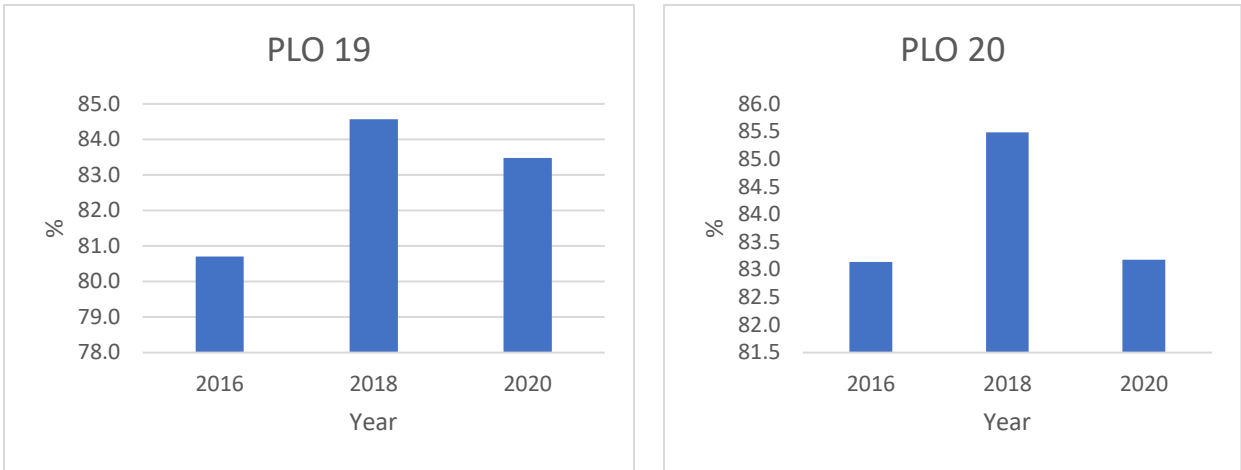


Figure 3: Histogram of PLOs – 2016, 2018 and 2020.

The PLOs and POs are partially dependent on the SLOs and so actions taken in the courses and curriculum affected them as well. A new course (CM&E 431: Sustainable Design and Construction) was developed and offered to construction management students to address sustainability. New software and survey equipment were also purchased to address information technology and improve the curriculum.

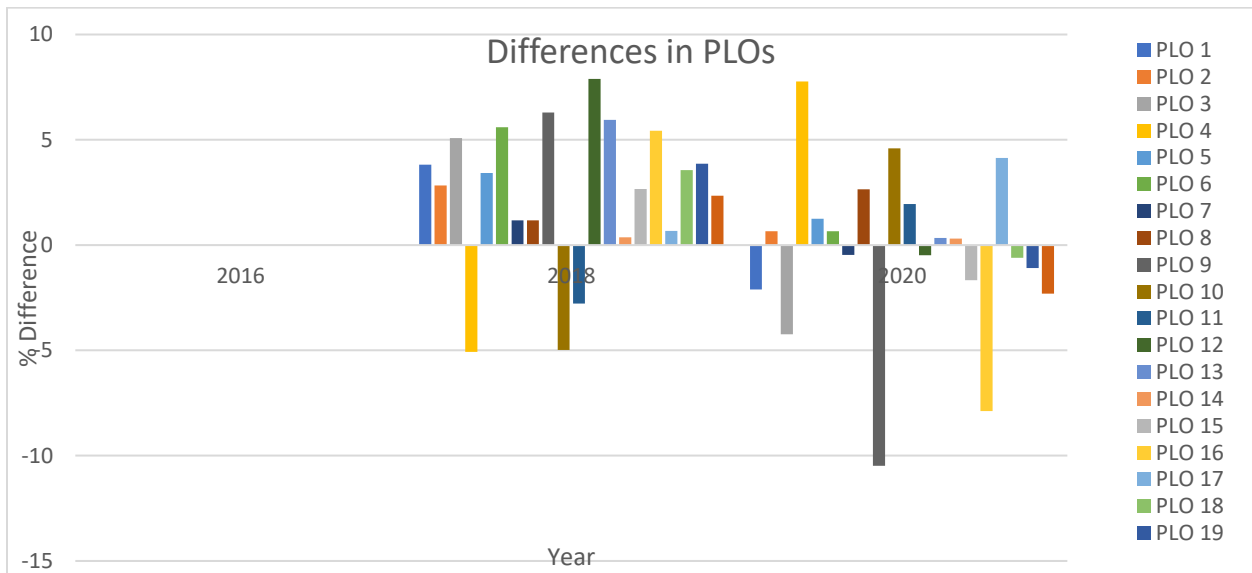


Figure 4: Histogram of Changes in PLOs – 2016, 2018 and 2020.

## Analyses of Program Outcomes

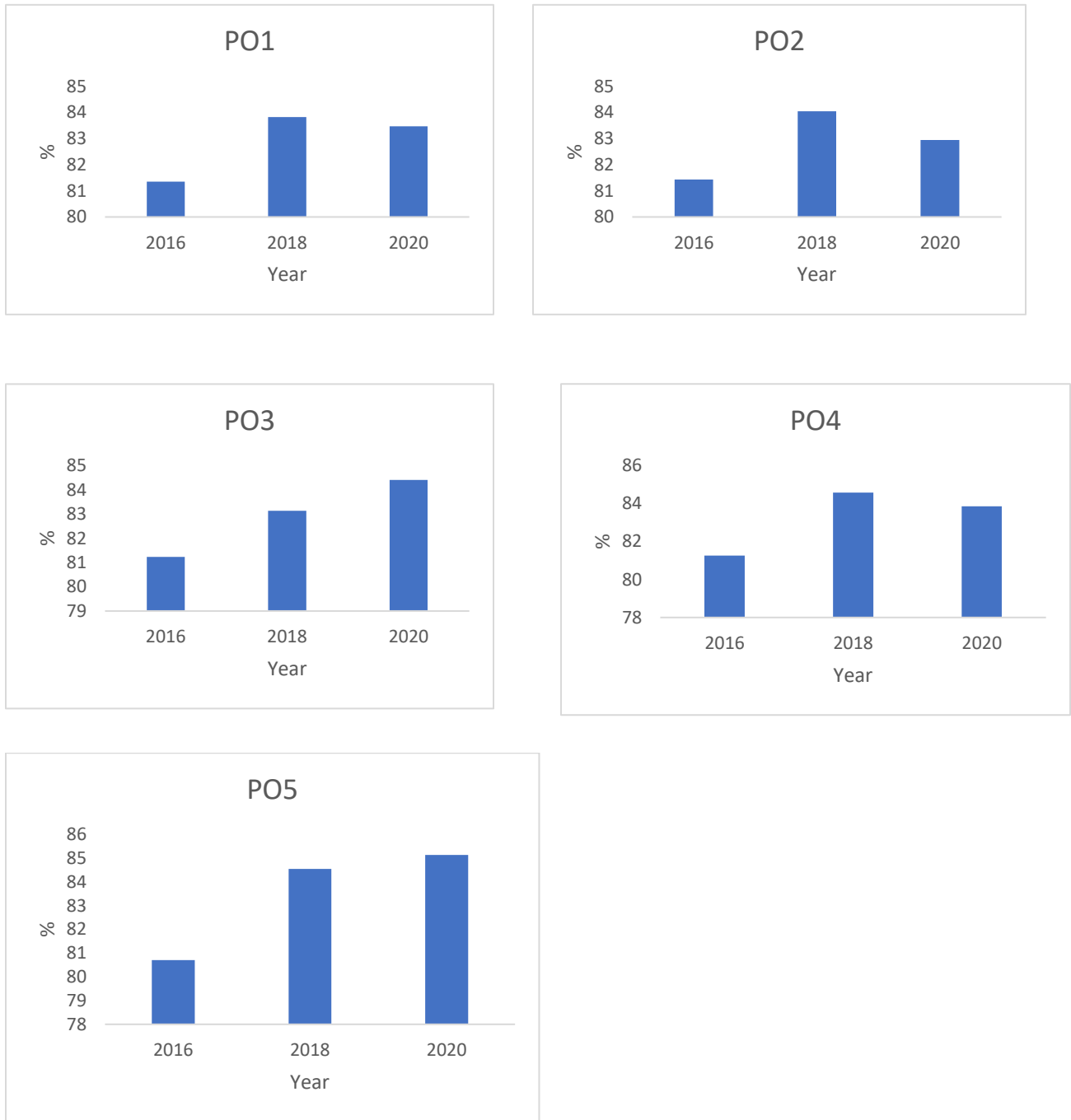


Figure 5: Histogram of POs – 2016, 2018 and 2020

The performance of the PLOs and POs in 2016, 2018 (transition year) and 2020 was good as they were all above the threshold of 70%.