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# **Report on Program Learning Outcomes**

## **Information Systems Program**



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## 1. Introduction

In the Second Semester 2012-2013, the Information Systems' department adopted the ABET CAC's (a-j) SOs for the Information Systems program after many meetings, discussions, seminars and consultation with the program constituencies including faculty members, Program Advisory Committee (PAC) and current students. After approval of the IS SOs, they are posted in the college handbook, posters fixed on the college corridors, college website [ <http://cscis.nu.edu.sa/en/is-sos> ] and paper binding folders distributed to students, faculty and public.

In the first semester of academic year 2012/2013, the department met with all faculty members and discussed the ABET CAC's SOs (a-j) for the IS program. The department faculty members gave their opinions through surveys. Also, the Development and Quality Unit (DQU) took the opinions and comments through surveys from the current students about the ABET CAC's SOs (a-j) for the IS program. Further, the PAC (in the second semester 2012/2013) reviewed and approved the ABET a-j IS SOs through meeting and filled survey. Finally, the faculty members reviewed all comments from other stakeholders and decided to adopt ABET CAC's (a-j) IS SOs in the second semester of academic year 2012/2013. The department and college council approved the SOs for the IS program. Finally, these student outcomes of the IS program are printed and fixed on the college's corridors, the department's website and in the college's catalogue and folder. Note that all related evidences and materials and Minutes of Meetings (MoMs) of the process for the establishment of the SOs are available as display materials.

By the time of graduation, students of the Information Systems program are expected to attain the following student learning outcomes:

- (a) An ability to apply knowledge of computing and mathematics appropriate to the discipline;
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;

- (c) An ability to design, implements, and evaluate a computer-based system, process, component, or program to meet desired needs;
- (d) An ability to function effectively on teams to accomplish a common goal;
- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities;
- (f) An ability to communicate effectively with a range of audiences;
- (g) An ability to analyze the local and global impact of computing on individuals, organizations and society;
- (h) Recognition of the need for and an ability to engage in continuing professional development;
- (i) An ability to use current techniques, skills, and tools necessary for computing practice.;
- (j) An understanding of processes that support the delivery and management of information systems within a specific application environment[IS]

Note: IS program will adopted the new changes of ABET SO a [ An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline] starting from the new assessment cycle [ 2017 – 2020].

During the establishment of Student learning Outcomes (SOs) for Information Systems program, relevant academic and professional advice was considered. More Specifically, the process started by considering the latest recommendations of world renowned societies such as IEEE/CS, CSAB, ACM in the IS area. In addition the requirements of national and international accreditation agencies (NCAAA and ABET) as well as the Saudi National Qualification Framework (NQF) were extensively considered in the formulation of the SOs. Note that SOs are broad statements that describe what students will be able to do and know by the end of the program (time of graduation).

Based on the comments received from the program's stakeholders and after careful review of the requirements of accreditation agencies (NCAAA and ABET) and NQF as well as the recommendations of societies (IEEE/CS, CSAB, ACM), the program, in the academic year 1433/1434 (2012/2013), decided to:

- Adopt the ABET a-j IS Student Outcomes (SOs) for the Information systems program at Najran University (NU).
- Modify the CS curriculum by adding extra courses related to mathematics and sciences to ensure consistency with NCAAA, ABET and NQF.
- Approve that the university Preparatory Year (PY) is part of the IS program because its student learning outcomes are very consistent with the SOs of the IS program. The total credit hours of the IS program including PY ( $108 + 27 \text{ (PY)} = 135$  credit hours) meets the NQF minimum requirement of 120 credit hours for a bachelor degree.

The NCAAA and NQF identify SLOs (Student Learning Outcomes) in five learning domains: Knowledge, Cognitive Skills, Interpersonal Skills and Responsibility, Communication Information Technology and Numerical, and Psychomotor Skills. It is required that the SOs of a program must be consistent with NQF and covering all of the domains of learning except psychomotor level. However, the ABET a-j IS SOs adopted by our program has no outcomes that belong explicitly to the NCAAA knowledge skills level. Yet, if two learning outcomes have the same contexts with different levels of learning, then we can only consider one learning outcome with the higher level of learning.

Using the above outcomes, it is acceptable to consider the second outcome because if students are able to design, it is obvious that they are able to describe. Table 1 illustrates the SOs of the IS program written in NCAAA learning domains. Our set of SOs is consistent with the NQF learning domains even though we don't have explicit SOs at the knowledge skills level. The following points justify our choices of having no explicit outcomes at the knowledge level:

- Outcomes at the knowledge level have the same contexts as those at the cognitive level. Therefore, if students achieve SOs at the cognitive level, it is obvious that they achieve it at the knowledge level.
- A set of outcomes at the knowledge level is delivered throughout the program (Courses and other strategies) to support the achievements of outcomes at the cognitive level.

ABET a-j IS outcomes are world-wide and are adopted by the best universities (KFUPM and KSU) in Saudi Arabia.

Table 1: SOs of the Information Systems Program

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline;	<ul style="list-style-type: none"> <li>• Lecture: Teacher gives concepts theoretically and by applying those to a real-world case study to be discussed using different examples on different situations.</li> <li>• Discussions: the teacher gives an idea to students and asks them to give their viewpoints, as well as, their reasoning regarding it.</li> </ul>	<p><b>Direct Methods:</b></p> <ol style="list-style-type: none"> <li>1. Course Learning Outcomes assessment (Each Semester)</li> <li>2. Performance Indicators with a set of rubrics (once every assessment cycle)</li> </ol> <p><b>Indirect Methods:</b></p> <ol style="list-style-type: none"> <li>1. Exit Survey (Each Semester)</li> <li>2. Current Student Survey (Each Semester)</li> <li>3. PAC Meeting and Discussions (Once a Year)</li> </ol>
2.2	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;	<ul style="list-style-type: none"> <li>• Cooperative Learning: Teacher divides students into groups who are given problem-based assignments and homework to be submitted on a specified deadline.</li> <li>• Student-centred learning should be designed to facilitate the learner in doing, thinking, manipulating, constructing, testing, analysing and reflecting.</li> </ul>	
2.3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs;	<ul style="list-style-type: none"> <li>• Organizing the flow of thoughts.</li> <li>• Increasing teaching efficiency by use of software.</li> <li>• Participating in tutorial classes and open lab.</li> </ul>	

2.4	An ability to use current techniques, skills, and tools necessary for computing practice;	<ul style="list-style-type: none"> <li>Use more real life examples in the lecture relating to the surroundings of the students to draw attention that certainly helps them to concentrate more on the specific topic. (b-i-3)</li> <li>During laboratory hours all concepts of theory are discussed through applying them to a case study. During this discussions between the teacher and students regarding open-ended problems are taking place.</li> <li>Website visits.</li> <li>Give an assignment that includes critical problem which can be answered by internet search, reading the provided outcome and to analyse it.</li> </ul>	4. Alumni Survey 5. Employer Survey
2.5	An understanding of processes that support the delivery and management of information systems within a specific application environment[IS]	<ul style="list-style-type: none"> <li>Pick one student who fully understood a specific topic and let him describe in front of the class in his own manner.</li> <li>Recall the topics of last lecture and the critical issues based on different topics, which certainly helps students to recall memory frequently and store that topic in their memory for long term.</li> <li>Before start a new topic or at the end of each topic, students are given couple of minutes to imagine the real life scenarios relating to that topic including implementation, advantages, deficiencies etc. to improve their logical thinking.</li> </ul>	
<b>3.0 Interpersonal Skills &amp; Responsibility</b>			
3.1	An ability to function effectively on teams to accomplish a common goal;	<ul style="list-style-type: none"> <li>Lectures in which students are made aware of the significance of time management. c-ii-2. Creation of interactive teaching and learning environment.</li> </ul>	<b>Direct Methods:</b> 1. Course Learning Outcomes assessment (Each Semester)  2. Performance Indicators with a set of rubrics (once every assessment cycle)  <b>Indirect Methods:</b> 1. Exit Survey (Each Semester)  2. Current Student Survey (Each Semester)
3.2	An understanding of professional, ethical, legal, security and social issues and responsibilities;	<ul style="list-style-type: none"> <li>Discussions with students on ethical behaviour in conducting research.</li> <li>Quiz competition among groups.</li> <li>Individual counselling on assignments, research project and subject matter difficulties.</li> </ul>	
3.3	An ability to analyse the local and global impact of computing on individuals, organizations, and society;	<ul style="list-style-type: none"> <li>Group assignments and discussions where much of the most effective learning comes from the student explaining, discussing and defending her own ideas with his peers.</li> <li>Developing the awareness and confidence among students about their interpersonal know how.</li> </ul>	
3.4	An ability to recognize the need for and to	<ul style="list-style-type: none"> <li>Students' counselling and advising.</li> </ul>	

	engage in continuing professional development;	<ul style="list-style-type: none"> <li>• Making students alert about class attendance, timing, cleanliness and manner inside the class.</li> <li>• Encouraging a self-critical evaluation of student existing knowledge and behaviour pattern in solving problems in classroom.</li> <li>• During laboratory hours all concepts of theory are discussed through applying them to a case study. During this discussions between the teacher and students regarding open-ended problems are taking place. This strengthens both decisions making skills when choosing among a couple of alternatives and communication skills among them because the teacher is expected <b>that</b> all students participate in such discussions.</li> </ul>	3. PAC Meeting and Discussions (Once a Year) 4. Alumni Survey 5. Employer Survey
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	An ability to communicate effectively with a range of audiences	<ul style="list-style-type: none"> <li>• Assigning projects/assignments where students must search the relevant material/resource from internet to finish the task.</li> <li>• Deliver lectures in a steady pace with a loud voice and clear-perfect pronunciation.</li> <li>• Ask about different ideas on a specific topic in the lecture.</li> <li>• Class participation by oral questioning and answering.</li> <li>• Encourage students to consult the specialist in the computer lab or IT department for help on web-based material.</li> <li>• Assign research papers that must include analysis of material taken from acceptable web sites.</li> <li>• Demand the use of power point when giving presentations in specific topics of lectures, assignments, and projects .</li> <li>• Solving lots of problems in programming and database systems, its performance, and design.</li> <li>• Require that written homework be typed in proper format.</li> <li>• Numerical skills assessed during orientation. Special tutorials provided for those in need.</li> <li>• Assignments include numerical analysis whenever relevant to topic concerned.</li> <li>• Students will be divided into groups and given programming-based assignments which will help them to work collaboratively, decide independently, and learn more skills to</li> </ul>	<p><b>Direct Methods:</b></p> 1. Course Learning Outcomes assessment (Each Semester) 2. Performance Indicators with a set of rubrics (once every assessment cycle) <p><b>Indirect Methods:</b></p> 1. Exit Survey (Each Semester) 2. Current Student Survey (Each Semester) 3. PAC Meeting and Discussions (Once a Year) 4. Alumni Survey 5. Employer Survey



		<p>communicate with people.</p> <ul style="list-style-type: none"> <li>During laboratory hours all theoretical concepts are discussed through applying them to a case study. During this discussions between the teacher and students regarding open-ended problems are taking place. This strengthens both decisions making skills when choosing among a couple of alternatives and communication skills among them because the teacher is expected to all students participate in such discussions.</li> </ul>	
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### Enabled Student Characteristics

As indicated above, the department has adopted the ABET CAC's (a-j) student outcomes. Table 2 Table 3, and Table 4 show the relationships of IS major courses, non-major courses, and Preparatory Year (PY) courses to SOs respectively. More specifically, each course is mapped to one or more SOs. It is clear through these tables that all characteristics of SOs are covered with the courses especially the IS program specific SOs (SO (j) and SO (j)).



Table 2: Relationship of the IS Courses in the Curriculum to the Student Outcomes

Required IS Courses	IS Student Outcomes a-j									
	a. An ability to apply knowledge of computing and mathematics appropriate to the discipline;	b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	c. An ability to design, implements, and evaluate a computer-based system, process, component, or program to meet desired needs.	d. An ability to function effectively on teams to accomplish a common goal.	e. An understanding of professional, ethical, legal, security and social issues and responsibilities.	f. An ability to communicate effectively with a range of audiences;	g. An ability to analyze the local and global impact of computing on individuals, organizations, and society;	h. An ability to recognize the need for and to engage in continuing professional development.	i. An ability to use current techniques, skills, and tools necessary for computing practice.	j. An understanding of processes that support the delivery and management of information systems within a specific application environment. [IS]
111CSS-4 Computer Programming-1	√	√	√						√	√
113CSS-4 Object Oriented Programming		√	√						√	√
212CSS-3 Data Structures	√	√	√						√	√
227CSS-3 Operating Systems	√	√	√						√	√
224CIS-3 Visual Programming	√		√		√		√		√	√
230CIS-3 Fundamental of Databases	√	√	√	√		√			√	√
240CIS-3 Information Systems Analysis and Design	√	√	√						√	
324CIS-3 Modern Applications Development	√	√	√					√	√	√
335CIS-3 Database Management Systems	√	√	√						√	√
337CIS-3 Database Management Systems Administration		√			√		√	√		

342CIS-3 Information Systems Engineering	√	√	√		√			√	√	√
351CIS-3 Information System Project Management	√	√	√						√	√
370CIS-3 Data Communication and Computer Networks	√	√							√	√
410CIS-3 Information System Policies and Strategies	√	√	√		√		√	√	√	√
420CIS-3 ICT Networks Administration	√	√			√					
430CIS-3 Electronic Business	√	√							√	√
440CIS-3 Multimedia Technologies	√	√	√						√	√
446CIS-3 Internet Applications Development	√	√	√					√	√	√
450CIS-3 Decision Support Systems	√	√	√						√	√
460CIS-3 Information Systems Security Administration	√	√			√					
470CIS-3 Geography Information Systems	√	√	√						√	
491CIS-4 Project-1	√	√	√	√	√	√		√	√	√
492CIS-4 Project-2	√	√	√	√	√	√		√	√	√

Table 3: Relation of non-major courses in the curriculum to the Student Outcomes

Non-IS Courses	Student Outcomes a-j									
	a. An ability to apply knowledge of computing and mathematics appropriate to the discipline;	b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	c. An ability to design, implements, and evaluate a computer-based system, process, component, or program to meet desired needs.	d. An ability to function effectively on teams to accomplish a common goal.	e. An understanding of professional, ethical, legal, security and social issues and responsibilities.	f. An ability to communicate effectively with a range of audiences;	g. An ability to analyze the local and global impact of computing on individuals, organizations, and society;	h. An ability to recognize the need for and to engage in continuing professional development.	i. An ability to use current techniques, skills, and tools necessary for computing practice.	j. An understanding of processes that support the delivery and management of information systems within a specific application environment. [IS]
101ACC-3 Accounting principles										√
104PHYS-4 Principles of Physics	√	√							√	
106MATH-3 Introduction to Integration	√									
111ISL-2 Introduction to Islamic Culture 1				√	√					
112ISL-2 Introduction to Islamic Culture 2				√	√					
113ISL-2 Islamic Culture 3				√	√					
114IC-2 Islamic Culture 4				√	√					
152MATH-3 Discrete Mathematics	√									
201ARAB-2 Arabic Language (Skills)				√	√					
202ARAB-2 Arabic Writing				√	√					

211GMAN-3 Principles of Management										√
324STAT-3 Engineering Statistics and Probability	√									
342MATH-3 Linear Algebra	√									

Table 4: Relation of Preparatory Year courses in the curriculum to the Student Outcomes

PY Courses	Student Outcomes a-j									
	a. An ability to apply knowledge of computing and mathematics appropriate to the discipline;	b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its	c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	d. An ability to function effectively on teams to accomplish a common goal.	e. An understanding of professional, ethical, legal, security and social issues and responsibilities.	f. An ability to communicate effectively with a range of audiences.	g. An ability to analyze the local and global impact of computing on individuals, organizations, and society;	h. An ability to recognize the need for and to engage in continuing professional development.	i. An ability to use current techniques, skills, and tools necessary for computing practice.	j. An understanding of processes that support the delivery and management of information systems within a specific application environment. [IS]
140TEC-3 Computer Skills	√	√	√			√			√	√
140MATH-2 Introduction of Mathematics	√									
140SKL-2 Learning, Thinking and Research Skills				√	√	√				
140ENG-2 English Language: Reading Skills		√		√	√	√				
141ENG-2 English Language: Writing Skills		√		√		√		√	√	
142ENG-2 English Language: Listening and						√				

Speaking Skills										
143ENG-2 English Language: Grammars	√					√				
150MAN-1 Occupational Ethics				√	√	√				
150MATH-4 Algebraic Sciences	√									
150SKL-2 Communication Skills										
150ENG-2 English Language: Speaking	√			√	√	√	√		√	
150ENG-3 Report Writing				√	√	√			√	

Currently, the student learning outcomes (PLOs) or student outcomes (SOs) are assessed by using both direct and indirect assessment methods. In this report we present PLOs/SOs assessment data from the two direct assessment methods including:

1. Assessment of student learning outcomes using course learning outcomes (CLOs)
2. Assessment of student learning outcomes using performance indicators (PIs), Embedded Questions and Rubrics

1. Assessment of student learning outcomes using course learning outcomes (CLOs):

The idea behind this method is that all courses are mapped to the appropriate student outcomes by relating CLOs of all courses to SOs. Mapping courses to SOs ensures that all SOs are addressed by several courses at different levels in the program. In addition, this will help us to know if student outcomes have not been met at a particular course. The assessment of SOs using CLOs assessment each semester supports us to maintain a semester-based continuous improvement by using the achievements of CLOs. The expected performance is 65% for each SO. Note that courses that are related to a specific SO have equal contribution.

2. Assessment of student learning outcomes using performance indicators (PIs), Embedded Questions and Rubrics:

This is our overall assessment method to evaluate the attainment of SOs. A set of Performance Indicators were developed for each one of the SOs. PIs are then aligned to the curriculum to

facilitate the collection of data. Data are then evaluated by using a set of rubrics. In this method, we collect data and evaluate each SO once in a complete assessment cycle (3-4 years).

The first cycle of PLOs or SOs assessment through PIs, embedded questions and rubrics started in 2012/2013 and finished in 2015/2016. Hence, the College of CSIS has planned a new cycle for the academic years 2017-2021 to assess the PLOs/ SOs and the new assessment plan is described below:

- Assessment plan is shown in Figure 1.

✓ **Assessment Types**

- We are using direct assessment and it will be achieved through performance indicators (PIs) for all IS SOs and using course learning outcomes (CLO). He said that direct assessment will be used for the direct examination or observation of student knowledge, skills and/or behaviours. e.g. Exams, Presentation, etc.
- Indirect assessment will be done through indirect methods, e.g. exit surveys, current student survey and meeting and survey with program advisory committee.

✓ **Assessment Methods**

The formative and summative assessment methods which will be used in updated assessment plan for year 2017 – 2021 are:

- **Formative Assessment.**
  - ▶ Formative assessments are on-going assessments, reviews, and observations in a classroom and or within an academic year or pre-determined time.
  - ▶ We should use formative assessment to improve instructional methods and student feedback throughout the teaching and learning process.
  - ▶ The goal of formative assessment is to *monitor student learning* to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning.
  - ▶ Example of formative assessment is quizzes, assignments, midterms, etc. It will be used in level 3 to 6.

- **Summative Assessment.**

- ▶ Summative assessments are typically used to evaluate the effectiveness of instructional programs and services at the end of an academic year or at a pre-determined time.
- ▶ The goal of summative assessments is to make a judgment of student competency after an instructional phase is complete.
- ▶ The goal of summative assessment is to evaluate student learning at the end of an instructional unit by comparing it against some standard or benchmark.
- ▶ Example of summative assessment is final exams, nationwide Tests and it will be done from levels 7 and 8.

### Proposed CSIS Assessment Planning 2017-2021(Conceptual Model)

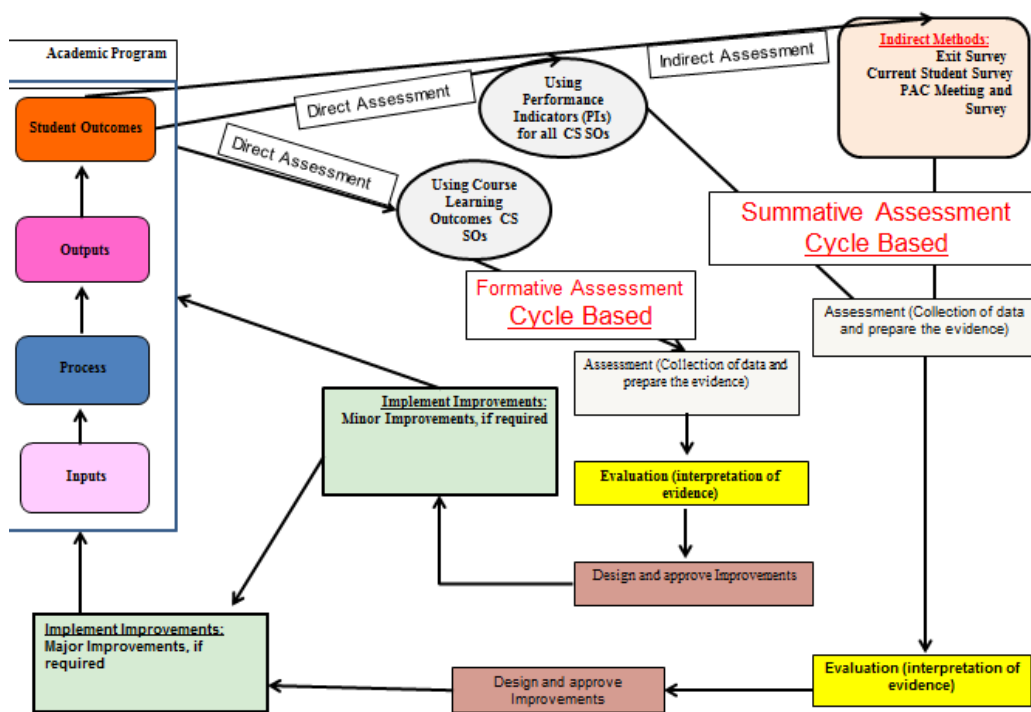


Figure 1: CSIS Assessment Plan for 2017 – 2021

- It has been presented the PLOs/SOs assessment plan time line for CS program. Figure 2 shows the PLOs/SOs assessment plan time line for computer science program.



**Program: Information Systems (IS):..... SOs Assessment Plan Time Line**

Student Outcomes (SOs)	CLOs Achievements						PIs and Rubrics						Exit Survey						Current Student Survey						PAC Survey							
	F 16/17	S 16/17	F 17/18	S 17/18	F 18/19	S 18/19	F 19/20	S 19/20	F 16/17	S 16/17	F 17/18	S 17/18	F 18/19	S 18/19	F 19/20	S 19/20	F 16/17	S 16/17	F 17/18	S 17/18	F 18/19	S 18/19	F 19/20	S 19/20	F 16/17	S 16/17	F 17/18	S 17/18	F 18/19	S 18/19	F 19/20	S 19/20
a) An ability to apply knowledge of computing and mathematics appropriate to the discipline	C	E	I									C	E	I			C	E	I			C	E	I								
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution	C	E	I									C	E	I			C	E	I			C	E	I								
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs				C	E	I						C	E	I			C	E	I			C	E	I								
d) An ability to function effectively on teams to accomplish a common goal			C	E	I							C	E	I			C	E	I			C	E	I								
e) An understanding of professional, ethical, legal, security and social issues and responsibilities				C	E	I						C	E	I			C	E	I			C	E	I								
f) An ability to communicate effectively with a range of audiences	C	E	I									C	E	I			C	E	I			C	E	I								
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society				C	E	I						C	E	I			C	E	I			C	E	I								
h) An ability to recognize the need for and to engage in continuing professional development				C	E	I						C	E	I			C	E	I			C	E	I								
i) An ability to use current techniques, skills, and tools necessary for computing practice	C	E	I									C	E	I			C	E	I			C	E	I								
j) An understanding of processes that support the delivery and management of information systems within a specific application environment			C	E	I							C	E	I			C	E	I			C	E	I								

Figure 2: SO Assessment plan time line for Computer Science Program

It has been discussed that DQU mode five groups which will be responsible for assessment of SOs for CS program. These five groups are shown in Table 5.

Table 5: SO Assessment groups for Computer Science Program

Group No.	Coordinators	Members	Student Outcomes
Group 1	Dr. Fekri	Dr. Khairi Mr. Basit Mr. Omar Mr. Mazen Gazzan Mr. Khalid Makdi	a i
Group 2	Dr. Shargabi	Mr. Selim Mr. Akram Mr. Adlan Mr. Abdullah Al Qahtani	b f
Group 3	Dr. Asadullah	Dr. Addin Mr. Shah Masud Mr. Naif Mr. Saltan Al Azmei	d j
Group 4	Dr. Ghassan	Dr. Khairan Mr. Golam faruque Mr. Yahya Mr. Bakri Mr. Mohammad Al Shahrani	c e
Group 5	Dr. Abdurrahman	Dr. Abwar Mr. Kafil Mr. Haji Mr. Moath Mr. Hamad Ali Mr. Ahmad Al Musabi	g h

### 3. Data

#### Assessment of student learning outcomes using course learning outcomes

The following Table 5 and Table 6 illustrate the attainment of Student Learning Outcomes (SOs) using the assessment of Course Learning Outcomes of First and Second semesters in the academic year 2016/2017. The overall PLOs/ SOs achievement using CLOs is presented in Table 7.

The idea behind this method is that all courses are mapped to the appropriate student outcomes by relating CLOs of all courses to SOs. Mapping courses to SOs ensures that all SOs are addressed by several courses at different levels in the program. In addition, this will help us to know if student outcomes have not been met at a particular course. The assessment of SOs using CLOs assessment each semester supports us to maintain a semester-based continuous improvement by using the achievements of CLOs. The expected performance is 65% for each SO. Note that courses that are related to a specific SO have equal contribution. Figure 3 illustrates graphical representation of SOs using CLOs in the academic year 2016/2017.

Table 5: Achievements of SOs using CLOs Achievements for IS courses First Semester 2016/2017

Course name	Code	Student Outcomes (SOs) (in %)									
		2.1 (a)	2.2 (b)	2.3 (c)	3.1 (d)	3.2 (e)	4.1 (f)	3.3 (g)	3.4 (h)	2.4 (i)	2.5 (j)
1. Programming Language 1	111CSS-4	66.67	66.67	33.33						33.33	0
2. Object Oriented Programming	113CSS-4	Not applicable as the number of students is less than 5									
3. Data Structures	212CSS-3	58.33	50	66.67					66.6	33.33	66.67
4. Visual Programming	224CIS-3	Not applicable as the number of students is less than 5									
5. Operating Systems	227CSS-3	Not Available									
6. Fundamentals of Databases	230CIS-3	100.00		91.66	100					91.66	100.00
7. Information System Analysis and Design	240 CIS-3	50	38.89	41.67	0		66.67	50			37.50

8. Modern Application Development	324CIS-3	Not Available									
9. Database Management Systems	335CIS-3	Not applicable as the number of students is less than 5.									
10. Database Management Systems Administration	337CIS-3	Not applicable as the number of students is less than 5.									
11. Information System Engineering	342CIS-3	Not Available									
12. Information System Project Management	351CIS-3	Not applicable as the number of students is less than 5.									
13. Data Communication and Computer Networks	370CIS-3	Not Available									
14. Information Systems Policies and Strategies	410CIS-3	Not Available									
15. Information Technology Network Administration	420CIS-3	Not Available									
16. Electronic Commerce	430CIS-3	Not applicable as the number of students is less than 5									
17. Multimedia Technology	440CIS-3	Not Available									
18. Internet Application Development	446CIS-3	Not Available									
19. Decision Support System	450CIS-3	Not Available									
20. Information Systems Security Administration	460CIS-3	Not Available									
21. GIS	470CIS-3	Not applicable as the number of students is less than 5									
Average		59.37	45.3	50.00	25	0	66.67	50	66.6	52.77	44.27

Table 7: Achievements of SOs using CLOs Achievements for IS courses Second Semester 2016/2017

Course name	Code	Student Outcomes (SOs) (in %)									
		2.1 (a)	2.2 (b)	2.3 (c)	3.1 (d)	3.2 (e)	4.1 (f)	3.3 (g)	3.4 (h)	2.4 (i)	2.5 (j)
Programming Language 1	111CSS-4					Not Available					
Object Oriented Programming	113CSS-4	Not Available whether number of students is more than 5									
Data Structures	212CSS-3	Not Available because there were two students and absent in the whole semester									

Visual Programming	224CIS-3	Not Available									
Operating Systems	227CSS-3	88.89	66.67	33.3					83.33	100	
Fundamentals of Databases	230CIS-3					Not offered the course					
Modern Application Development	324CIS-3	100	50	50				0	0	0	0
Database Management Systems Administration	337CIS-3	100	67	50						50	50
Data Communication and Computer Networks	370CIS-3	80	80							80	80
Information Systems Policies and Strategies	410CIS-3	100	100	100					75	75	75
Multimedia Technology	440CIS-3	100	100	100	0	0	0	0	0	100	100
Information Systems Security Administration	460CIS-3	85	75			100					
Information System Analysis and Design	240 CIS-3	Not Available whether number of students is 7									
Database Management Systems	335CIS-3	Not Available whether number of students is 3									
Information System Engineering	342CIS-3	Not Available									
Information System Project Management	351CIS-3	Not applicable as the number of students are less than 5.									
Electronic Commerce	430CIS-3	Not Available whether number of students is 12									
GIS	470CIS-3	Not Available									
Average		93.41	76.95	66.66	0	50	0	0	39.58	67.5	61

Table 7: IS Program's Overall SOs Assessment Result

IS SOs	2.1 (a)	2.2 (b)	2.3 (c)	3.1 (d)	3.2 (e)	4.1 (f)	3.3 (g)	3.4 (h)	2.4 (i)	2.5 (j)
SO Assessment 371	59.37	45.3	50	25	0	66.67	50	66.6	52.77	44.27
SO Assessment 372	93.41	76.95	66.66	0	50	0	0	39.58	67.5	61
Overall Assessment	76.39	61.125	58.33	12.5	25	33.335	25	53.09	60.135	52.635

### Assessment of student learning outcomes using performance indicators (PIs), Embedded Questions and Rubrics:

The assessment of the DQU at college of computer science and information systems for the cycle (2017-21), had selected SO(a) and SO(i) for assessment in the first semester of 2016-17 i.e Semester 371.

### Student Outcome (a,i):

- a) An ability to analyse a problem, and identify and define the computing requirements appropriate to its solution
- i) An ability to use current techniques, skills, and tools necessary for computing practice

Semester/Year Data collected: 371, **First Semester, 2016/2017**

Assessment Coordinator (Collection Agent): **Dr. Fikri Abdul Wedood**

Table 8: Assessment Process

SO	SO Description	Sources of Assessment	Assessment Method(s)	Target of Achievement	Evaluation of Results
a and i	<p>An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution</p> <p>An ability to use current techniques, skills, and tools necessary for computing practice</p>	<p>224CIS-3</p> <p>230CIS-3</p> <p>351CIS-3</p> <p>370CIS-3</p>	Embedded assessment	65% of the students at the accomplished or above levels	SO Assessment Group

### Evaluation Results

1. The instructors of the corresponding courses were asked to make question based to CLO's which had has a mapping to SO(a) and SO(i)
2. The instructor submitted to the SO assessment group, the scanned answer scripts of the students along with students grades achieved in that particular question.
3. The SO Assessment group aggregated ,evaluated and analysed the results
4. Based on the results action are proposed, to be taken in the assessment and evaluation stages!!

Table 9: Achievement for PLOs/ SOs (a,i) from all the selected IS Courses ( presented in %)

IS Course	SO (a)	SO (i)
370CIS-3	100	100
351CIS-3	N/A	100
230CIS-3	89	25
224CIS-3	50	75
<b>Overall Achievement</b>	<b>79.66</b>	<b>75</b>

## 4. Analysis

The Figure 3 shows the overall program learning outcomes (PLOs) / SOs achievement using CLOs in IS program for the first semester and second semester of the academic year 2016/2017. The assessment of SOs using CLOs assessment each semester supports us to maintain a semester-based continuous improvement by using the achievements of CLOs. The expected performance is 65% for each SO. Note that courses that are related to a specific SO have equal



contribution. Figure 3 illustrates graphical representation of SOs using CLOs in the academic year 2016/2017. The report presents that not a single SO has been achieved during this academic year using CLOs assessment data. It is notable that in second semester not a single SO has been assessed using the CLOs. There are few cases have been revealed for not achievement of SOs in second semester:

1. Some course files not yet been submitted until June 02, 2017 when the report is prepared
2. In some courses SOs are not been assessed because number of students are less than 5
3. In some courses SOs are not been assessed whether the number of students are equal to or more than 5.

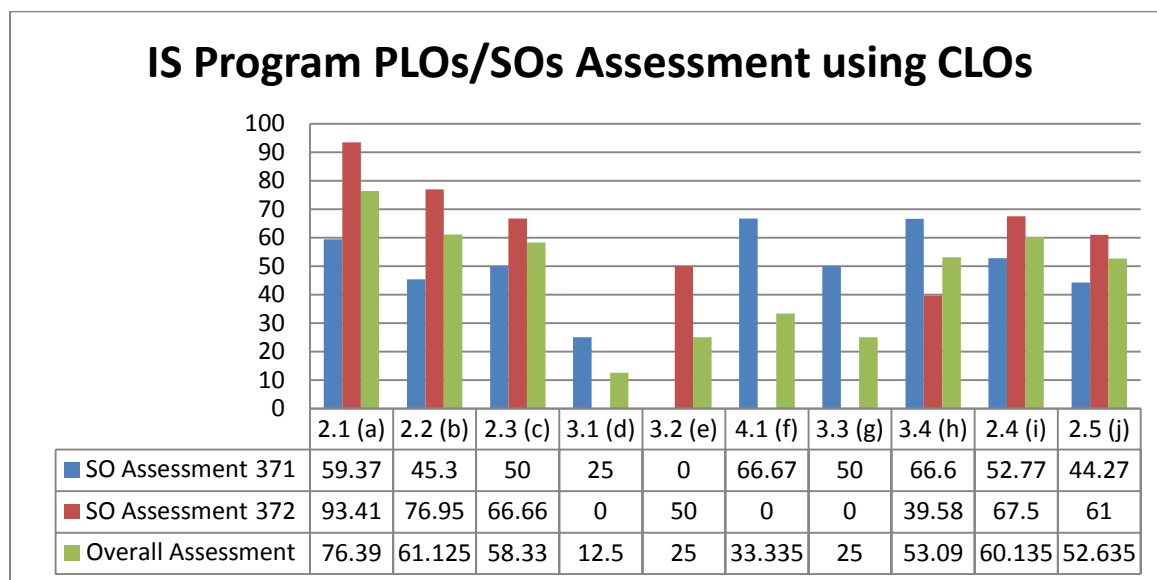


Figure 3: Student outcomes Achievements using CLOs achievements for First semester of the academic year 2016/2017

The Figure 4 shows the overall program learning outcomes (PLOs) / SOs achievement using PIs/ embedded questions in IS program for the first semester and second semester of the academic year 2016/2017.

The assessment of SOs using PIs/ embedded questions assessment each semester supports us to maintain a semester-based continuous improvement by using the achievements of PIs/ embedded

questions. The expected performance is 65% for each SO. Note that courses that are related to a specific SO have equal contribution. Figure 4 illustrates graphical representation of SOs using PIs/ embedded questions in the first semester of academic year 2016/2017.

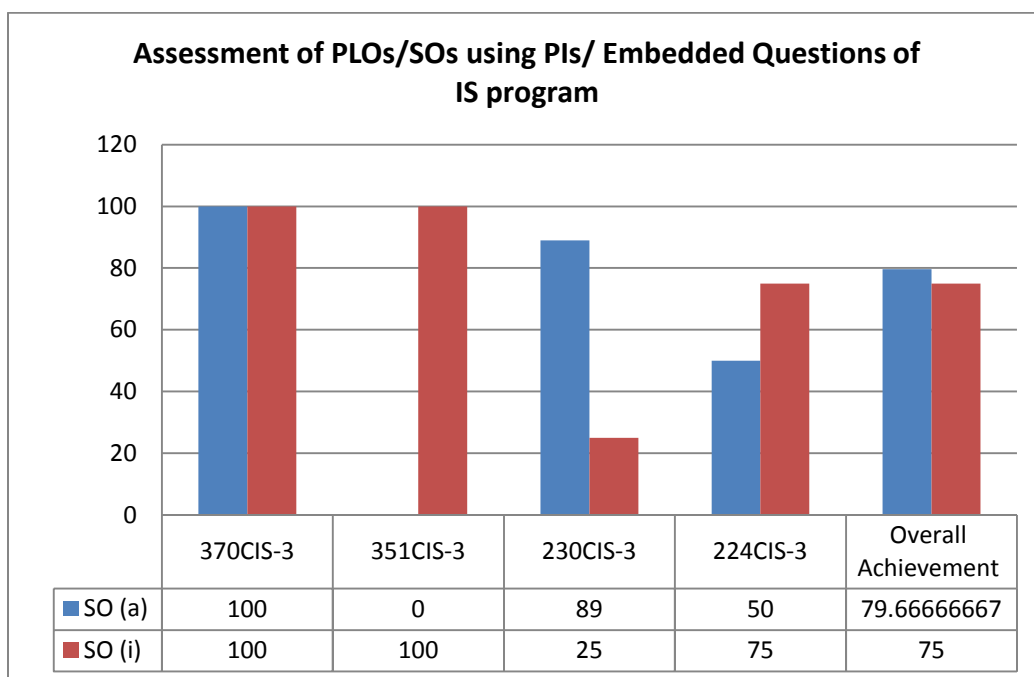


Figure 4: Illustrates graphical representation of SOs using PIs/ embedded questions in the first semester of academic year 2016/2017.

## 5. Conclusion

This report will give the opportunity to the faculty members of the program to bolster their teaching and relevant activities to enhance the quality of their teaching and to achieve more student learning outcomes.

## Annexes:

1. Annex 1: PLOs/SOs assessment data using CLOs
2. Annex 2: PLOs/SOs assessment data using PIs, Embedded questions, Rubrics