جامعة المجمعة
Majmaah University

Program learning outcomes (PLOs) Assessment Plan

Radiological Science and Medical Imaging Department
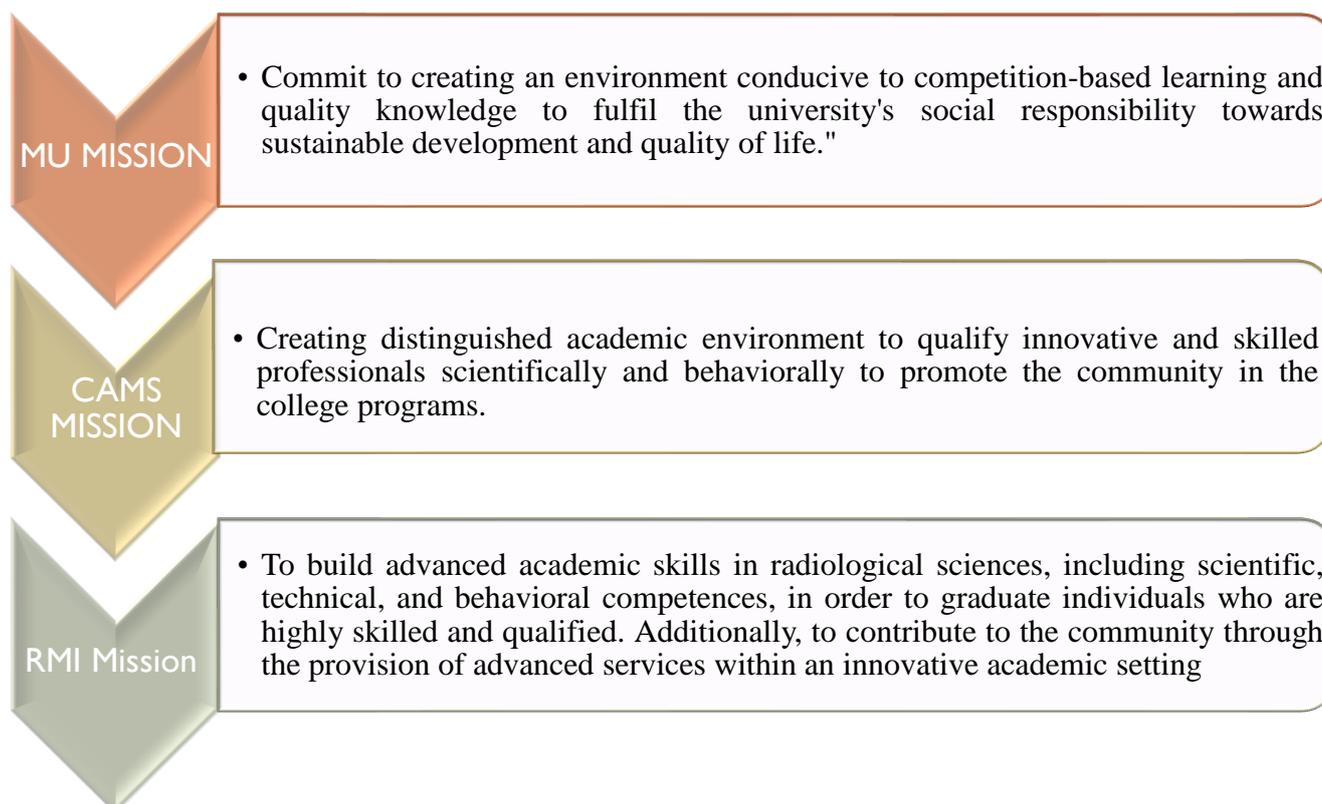
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1. PROGRAM MISSION, GOALS AND CONSISTENCY

1.1 INTRODUCTION:

The college of applied medical sciences in al Majmaah was established at Majmaah University on the approval of the Custodian of the two Holy Mosques, King Abdullah bin Abdulaziz Al Saud (May God rest his soul) Prime Minister and chairman of the Council of Higher Education, on the third of Ramadan of 03/09/1430H (24/8/2009). College of Applied medical sciences offers the program of Bachelor of radiological Sciences and medical imaging under the department of Radiological Sciences and Medical Imaging (RMI). The college was keen on defining the graduate's attributes of the program and formulated the desired learning outcomes from the program clearly, with absolute accuracy, and in line with the requirements of the Saudi Arabian qualifications framework, taking into account the academic and professional standards required by the Saudi Commission for Health Specialties. Based on these desired characteristics the program learning outcomes were designed.

1.2 PROGRAM MISSION:

MU MISSION
- Commit to creating an environment conducive to competition-based learning and quality knowledge to fulfil the university's social responsibility towards sustainable development and quality of life."

CAMS MISSION
- Creating distinguished academic environment to qualify innovative and skilled professionals scientifically and behaviorally to promote the community in the college programs.

RMI Mission
- To build advanced academic skills in radiological sciences, including scientific, technical, and behavioral competences, in order to graduate individuals who are highly skilled and qualified. Additionally, to contribute to the community through the provision of advanced services within an innovative academic setting

1.3 PROGRAM GOALS:

1. To provide unique specialists in radiological sciences through academically advanced environment.

2. To prepare qualified and updated graduates who follow up the most advanced technology in the field of Radiological Sciences.

3. To become successful technical advisors and managers in order to develop scientific research related to the radiological field.

4. To participate in life-long learning and become successful educators for healthcare community through higher education and continual professional development.

1.4 PROGRAM LEARNING OUTCOME:

Table 1: program learning outcomes

Program learning Outcomes	
Knowledge and Understanding	
K1	To describe positioning and radiographic techniques to competently demonstrate anatomical structures on a radiograph or other imaging modalities, taking into account radiation protection regulations.
K2	To identify and recall the impact of advanced radiological technology and research aspect solutions in societal and global context
K3	To choose suitable ionizing radiation.
K4	To explain problems-and solutions associate with critical-thinking skills in the performance of medical imaging procedures
Skills	
S1	To produce diagnostic images and able to create conclusions.
S2	To select exposure factors considering radiation protection laws for the patients, competent and workers. Recognizing emergency patient conditions and, if necessary, initiating lifesaving first aid.
S3	To demonstrate expected professional behavior within the profession's scope of practice and function effectively as a leader or member of the team
S4	To promote a positive learning environment for the education and clinical skills development in the field of radiology
Values, Autonomy and Responsibility	
V1	To demonstrate and formulate written, oral, and graphical communication in both technical and non-technical environments.
V2	To interpret an appropriate information and communications technology in gathering, and communicating medical images performance and reconstruction
V3	To use standard tests and measurements, to evaluate data and to apply patient care radiological procedures effectively

1.5 CONSISTENCY OF THE PROGRAM MISSION AND PROGRAM LEARNING OUTCOMES:

Table 2: Consistency between the program mission and Program learning Outcomes

Program learning out come	Program mission			
	Advanced academic skills	Scientific, Technical, and Behavioral Competences	Contribute to the community	Innovative academic setting
K1		√	√	
K2	√		√	
K3		√		
K4	√			√
S1		√		√
S2		√	√	
S3		√	√	
S4	√			√
V1		√		√
V2		√		√
V3			√	√

1.6 CONSISTENCY BETWEEN THE PROGRAM MISSION AND PROGRAM LEARNING OUTCOMES

Table 3*: consistency between the program mission and Program learning Outcomes*

Program learning out come	Program mission			
	Advanced academic skills	Scientific, Technical, and Behavioral Competences	Contribute to the community	Innovative academic setting
K1		√	√	
K2	√		√	
K3		√		
K4	√			√
S1		√		√
S2		√	√	
S3		√	√	
S4	√			√
V1		√		√
V2		√		√
V3			√	√

Table 4: Matrix of Consistency between the program learning outcome and Al Majmaah university graduate attributes

		Consistency of PLOs with MU graduate attributes											
		Graduate attributes											
		ILO1.1	ILO2.1	ILO2.2	ILO2.3	ILO2.4	ILO2.5	ILO2.6	ILO2.7	ILO2.8	ILO3.1	ILO3.2	ILO3.3
Program learning outcome	K1	■											
	K2				■								
	K3		■										
	K4			■									
	S1		■										
	S2					■							
	S3						■						
	S4					■							
	V1							■			■		
	V2								■				
	V3									■			

2. PLOS ASSESSMENT PLAN

2.1 Introduction

The plan for measuring and evaluating learning outcomes aims to track the level of performance in achieving these outcomes and the extent of their contribution to achieving the characteristics of graduates at the program and university levels. It also contributes to identifying the quality of the planning, teaching and evaluation processes, and then arriving at objective judgments that can be used to reveal what can be achieved. To be a reason for achieving the goals related to the student's performance and achievement or failing to achieve them, and then being able to take the necessary improvement measures to address the weaknesses and correct them in the subsequent development processes of the program and its courses alike.

2.2 OBJECTIVES:

1. Improve student learning – ensure that the students learn the most important skills, ideas, attitudes and gain appropriate knowledge and problem-solving skills.

2. Document evidence – this to provide evidence of student learning based on actual outcomes they have achieved for accreditation purposes

3. Identify areas of improvement – As achievement of each PLO is linked to various course learning outcomes, deficiencies in achievement, problems in assessment and or teaching strategies can be easily identified.

4. Provide feedback – provide both positive and negative feedback to the faculty, which helps to expand faculty involvement and control in assessment.

2.3 TEACHING AND LEARNING STRATEGIES

Teaching and learning strategies to achieve program learning outcomes Describe policies, teaching and learning strategies, learning experience, and learning activities, including curricular and extra-curricular activities, to achieve the program learning outcomes.

Based on the mission and objectives of the program the program learning outcomes were developed. All the course was then aligned to these program learning outcomes, for each outcome appropriate performance indicators were decided which the basis for all teaching and assessment activities became.

The assessment measures are designed to evaluate the effectiveness of teaching methods for delivering the intended program outcomes. A range of assessments strategies that matches all aspects of the instructional plans are being used for different modules. The assessment strategies are planned to match the instructional goals and objectives at the beginning of the semester and implemented throughout the semester. The selection of appropriate assessments also matches courses and program objectives.

Teaching and learning strategies (Curricular activities):

1. Lectures

2. Support readings

3. Group discussions

4. Writing reports

5. Activities and homework.

6. Result interpretation

7. Brainstorming sessions

8. Lab. Demonstrations

9. Lab training in conducting experiments.

10. Individual and group tasks including presentation and assignments.

11. Individual and group discussion

Extracurricular activities:

1. Volunteer activities

2. Cultural activities

3. Community Services

Table 5: Aligning the PLOs with teaching and learning strategies

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
01	**Knowledge**		
K1	To describe patient positioning and anatomical structures radiographically techniques via research aspect solutions in societal and global context.	Lecture, Support readings, Group discussions, Writing reports, activities and homework.	Direct Assessment: Written Exams, long and short essays, group reports.
K2	An ability to explain problems-and solutions associate with critical-thinking skills in the performance of medical imaging procedures		
K3	An ability to choose suitable ionizing radiation.		Indirect Assessment: Surveys
K4	To explain problems via critical thinking in medical imaging procedures and conclude the solutions		
2.0	**Skills**		
S1	To produce diagnostic images and able to create conclusions.	Lectures, Group work and Discussion, Case studies, Brainstorming sessions.	Direct Assessment: Written exams, long and short essays, Analytical reports, Case studies, Video analysis, group reports assessments, lab reports assessments.
S2	An ability to select exposure factors considering radiation protection laws for the patients, competent and workers. Recognizing emergency patient conditions and, if necessary, initiating lifesaving first aid.		
S3	Ability to interpret an appropriate information and communications technology in gathering, and communicating medical images performance and reconstruction		Indirect Assessment: Surveys
S4	An ability to use standard tests and measurements, to evaluate data and to apply patient care radiological procedures effectively	Demonstrations on use of lab equipment. Lab training.	Direct Assessment: Lab examination and reports. Indirect Assessment: Surveys
3.0	**Value**		
V1	An ability to demonstrate expected professional behavior within the profession's scope of practice and function effectively as a leader or member of the team	Lab demonstrations individual and group tasks including presentation and assignments.	Direct Assessment: Assessment of laboratory practices, Assessment of individual and reports. And presentations
V2	An ability to demonstrate and formulate written, oral, and graphical communication in both technical and non-technical environments		Indirect Assessment: Surveys
V3	An ability to promote a positive learning environment for the education and clinical skills		

	development in the field of radiology		

2.4 ASSESSMENT DURATION:

The program's learning outcomes are measured for all academic levels throughout the program, starting from the third level until the ninth level for both male and female students. All students are measured as one group, without dividing according to academic level. The program adopts approach for Assessing the program learning outcomes every year, while the course learning outcomes are measured every semester according to specific and recognized performance indicators. The performance levels for the current year are compared with the previous years to obtain results that help develop an improvement plan to be followed in the next year

2.5. KEY PERFORMANCE INDICATORS (KPIS):

KPIs are quantitative and qualitative measures used to review an organization's progress against its goals. Educational KPIs were developed by the quality team and each CLO was linked to a particular KPI and the achievement of these KPIs was measured through direct assessment sheet [DAS].

If the student gets less than 70% marks for a particular KPI then it is considered as unsatisfactory, if the marks more than 70% it is considered as satisfactory achievement.

Achievement of each course learning outcome along with the type of assessment method used in each course and the associated KPI was documented in the direct assessment sheet. The achievement of each PLO and associated KPI across all the courses was then calculated at the end of academic year. If achievement of any PLO was underachieved or showed large variation, this could then be easily traced back to the course or the mode of assessment that was responsible and corrective strategies can be recommended for the next academic year.
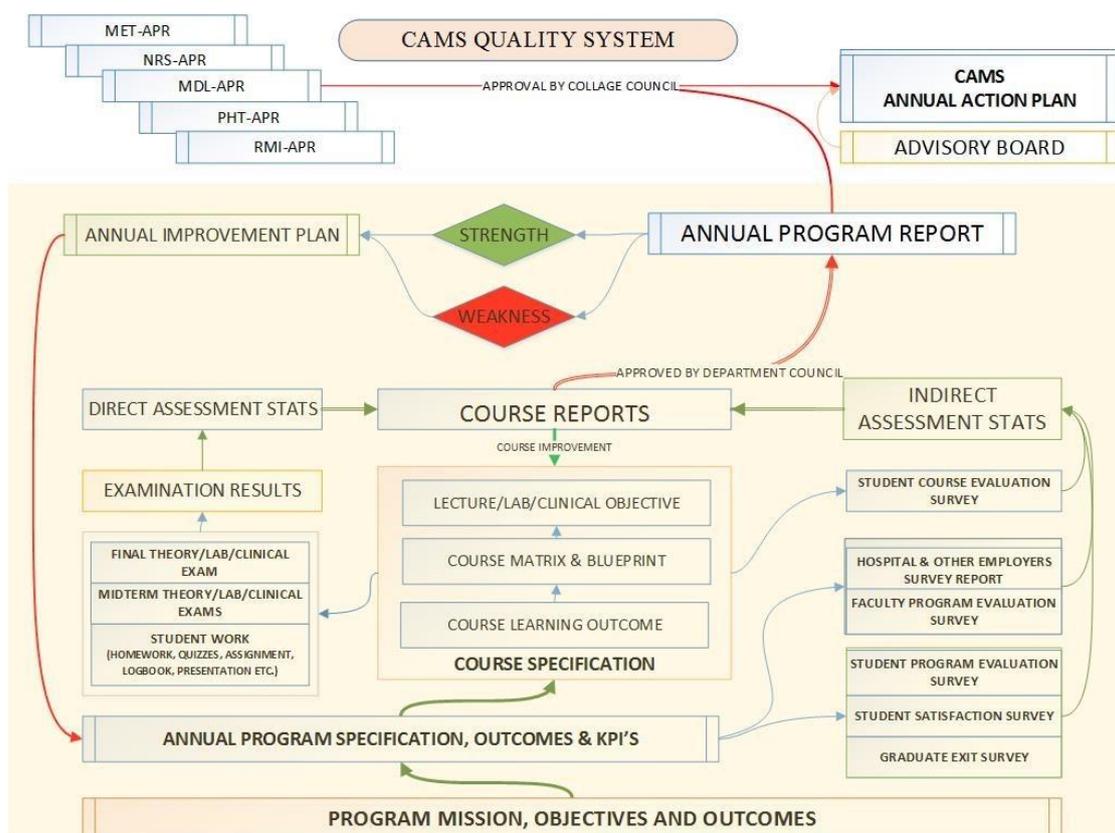
2.6 ASSESSMENT METHOD AND PROCEDURE:

There are two assessment method that is used to measure achievement of program learning outcomes in every domain of learning. Those are:

1- Direct Assessment: The process of assessment is carried out by course works such as quizzes, exams, projects, presentations, homework, presentation lab report, assignment etc., Where the grades on these exercises are directly tied to the course outcomes.

2 Indirect Assessment: the indirect assessment is conducted through varies surveys include   program learning outcome Evaluation Survey (POES), Employers' satisfaction survey, Course Evaluation Survey (CES), Student Experience Survey (SES) and Program Evaluation Survey (PES).

2.6.1 METHOD OF DIRECT ASSESSMENT:

1- The program had total of 11 PLOs and each PLO was linked to course learning outcomes (CLOs) of different courses.37 core courses in addition to 6courses related to the tracks of Radiological Sciences and medical imaging are taught in the whole courses and each course has 2-3 course learning outcomes each of which are linked to the 11 PLOs. As show in table

Table 6 Program learning Outcomes Mapping Matrix

Align the program learning outcomes with program courses, according to the following desired levels of performance (I = Introduced   P = Practiced M = Mastered)

Courses	Program Learning Outcome NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI232	I	I			I						
RMI233	I			I	I						
RMI234	I		I			I					
RMI235	I					I			I		
RMI237		I				I			I		
RMI241	I	I			I						
RMI242	I	I				I					
RMI243		I	I				I				
RMI244	I		I					I	I		
RMI245		I						I	I		
RMI246	I			I		I					
RMI247	I	I				I					
RMI351				I		I		I			
RMI352			I			I		I			
RMI353				I		I		I			
RMI354	I		I					I			
RMI355							I		I	I	
RMI361				P		P		P			
RMI362		P	P				P				
RMI363				P		P		P			
RMI364		P	P				P				
RMI365			P			P		P			
RMI366							P		P	P	
RMI471			P			P	P				
RMI472		P		P			P				
RMI473		P						P	P		
RMI474				P		P		P			
RMI 475		P		P			P				
RMI476								P	P		P
RMI481			M				M		M		
RMI482			M				M		M		
RMI483				M				M		M	
RMI484			M				M		M		
RMI485								M		M	M
RMI486			M				M			M	
RMI (G1)				M				M			M

Courses	Program Learning Outcome NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI591					M			M			
RMI592								M		M	M
RMI(G2)			M					M			M
RMI(G3.G4 G5.G6)				M				M			M

Table 7: Program Learning Outcome (CT Track):

Courses	Program Learning Outcome (CT Track): NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI411				M				M			M
RMI412				M				M			M
RMI513				M				M			M
RMI514				M				M			M
RMI515				M				M			M
RMI516				M				M			M

Table 8: Program Learning Outcome (MRI Track):

Courses	Program Learning Outcome (MRI Track): NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI421				M				M			M
RMI422				M				M			M
RMI523				M				M			M
RMI524				M				M			M
RMI525				M				M			M
RMI526				M				M			M

Table 9: Program Learning Outcome (US Track):

Courses	Program Learning Outcome (US Track): NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI431				M				M			M
RMI432				M				M			M
RMI533				M				M			M
RMI534				M				M			M
RMI535				M				M			M
RMI536				M				M			M

Table 10 Program Learning Outcome (Radiotherapy Track):

Courses	Program Learning Outcome (Radiotherapy Track): NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI441				M				M			M
RMI442				M				M			M
RMI543				M				M			M
RMI544				M				M			M
RMI545				M				M			M
RMI546				M				M			M

Table 11: Program Learning Outcome (NM Track)

Courses	Program Learning Outcome (NM Track): NQF Learning Domain and Learning Outcomes										
	Knowledge				Skills				Values		
	K.1	K.2	K.3	K.4	S.1	S.2	S.3	S.4	V.1	V.2	V.3
RMI451				M				M			M
RMI452				M				M			M
RMI553				M				M			M
RMI554				M				M			M
RMI555				M				M			M
RMI556				M				M			M

2- The CLOs are measured using specific assessment tools that are appropriate to the nature of the outcome and to the method of teaching it, which is specified in the course specifications by the course coordinator at the beginning of the semester.as show in the following table

Table 12: Linking course learning outcomes, teaching strategies, and assessment

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1				
1.2				
1.3				
1.4				
2.0	Skills			
2.1				
2.2				
2.3				
3.0	Values, autonomy, and responsibility			

Cod e	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.1				
3.2				
3.3				

3- Mapping the marks of the "Assessment Tools" to their designated CLOs using the direct assessment sheet (DAS) which is an excel sheet prepared by quality unit, then accumulating the marks of all CLOs for each student as show in the following
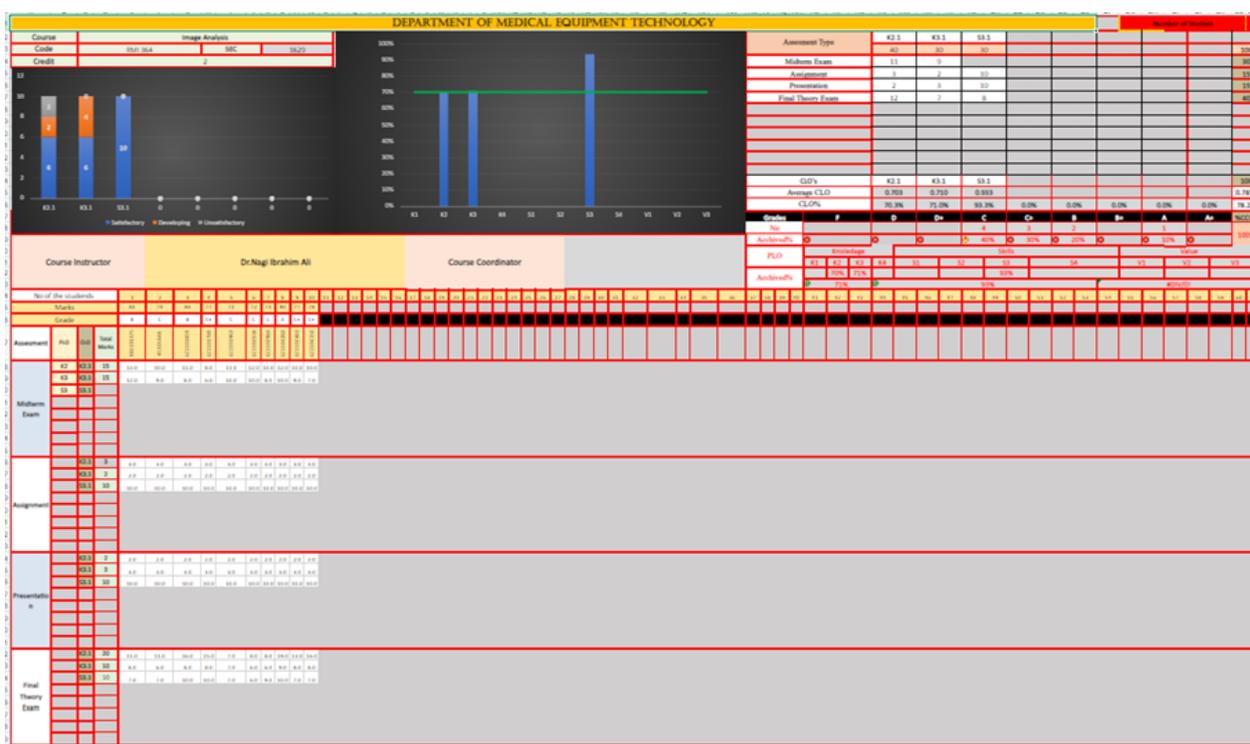

Figure 2:the direct assessment sheet which is used for statistical purposes to calculate the CLOS and PLOs

4- The DAS give and information about CLOs and the PLOS achievement

The CLOS is represented as the number of students through three rubrics

1. Satisfactory: number of the students those get more than 70% in the CLOS
2. Developing: number of the students those get more than 60%
3. Unsatisfactory: number of the students those get less than 60% of the CLOS

While the achievement of the PLOS is described as percentage If the student gets less than 70% marks for a particular KPI then it is considered as unsatisfactory, if the marks more than 70% it is considered as satisfactory achievement.
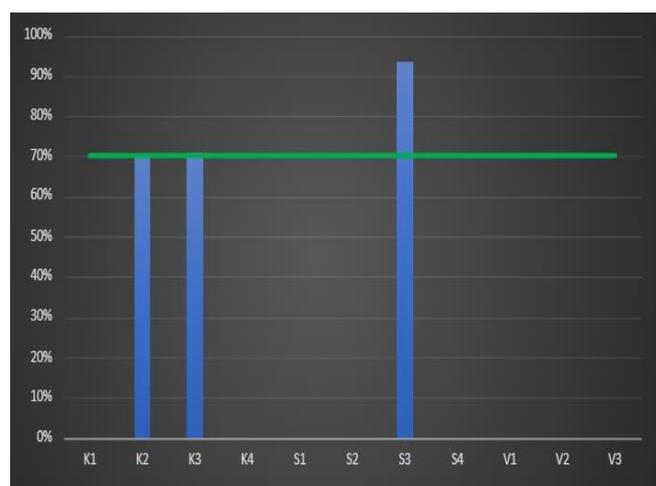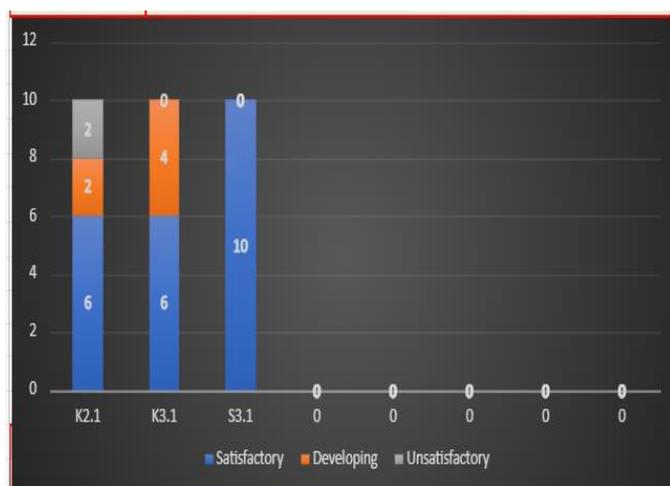
Figure 3: part from the DAS show the achievement in the CLOS represented as students' number and classified in to three categories 1), and show the achivement ibn the PLOS represented as percentage 2)

4- The data and results obtained by the direct assessment sheet are used in the preparation course reports and program learning outcomes assessment report and annual program reports in which the results are discussed and analyzed, and strengths and Weaknesses are obtained from them. This result is used later to create an improvement plan that is used in the following year to prepare the program specification and course specifications.

Table 13: Course Learning Outcomes Assessment Results

Course Learning Outcomes (CLOs)		Related PLOs Code	Assessment Methods	Assessment Results		Comment on Assessment Results
				Targeted Level	Actual Level	
1	Knowledge and Understanding:					
1.1						
1.2						
1.3						
1.4						
2	Skills:					
2.1						
2.2						
2.3						
3	Values, autonomy, and responsibility					
3.1						
3.2						
....						

Table 14 Program Learning Outcomes Assessment and analysis according to PLOs assessment plan *

#	Program Learning Outcomes	Assessment Methods (Direct and Indirect)	Targeted Performance (%)	Assessment Results
Knowledge and Understanding				
K1				
K2				
K3				
K..				
Skills				
S1				
S2				
S3				
S..				
Values, autonomy, and responsibility				
V1				
V2				
V3				
V..				

2.6.2 METHOD OF INDIRECT ASSESSMENT:

The indirect evaluation of learning outcomes is carried out according to a set of questionnaires that were determined by the program and these surveys include program learning outcome Evaluation Survey (POES), Employers' satisfaction survey, Course Evaluation Survey (CES), Student Experience Survey (SES) and Program Evaluation Survey (PES). The following form can be used:

Table 15 :indirect assessment for the PLOS

Summary of indirect assessment			
Program Learning outcomes	In Direct assessment (**Target performance level**)	In Direct assessment (survey name 1)	InDirect assessment (survey name 2)
Knowledge and understanding			
K1			
K2			
K3			
K4			
Skills			
S1			
S2			
S3			
S4			

	Values, autonomy, and responsibility			
V1				
V2				
V3				

2.7 Responsibility:

Table 16:the assessment tools, responsibility and time

Activity	Responsibility	Implementation methods	Execution time	Target	Desired results	Follow-up
Exit Exam	Committee for Measuring and Evaluating Learning Outcomes se.	Electronic test through electronic platforms	The last month of the last semester	Expected Graduated Student	PLOs (knowledge and Skill.)	RMI Quality Committee .
Direct assessment	Course instructor.	exam and class activities	At the end of the semester	all RMI students with their different academic level	PLOs aligned to each course	RMI Quality Committee
In direct assessment surveys	RMI Quality Committee	Ways Statistical.	The last month of the semester	Students expected to graduate.	PLOs (knowledge, Skills, Values)	RMI Quality Committee .
	RMI Quality Committee	Ways Statistical.	The last month of the semester	sample of Employees	PLOs (knowledge, Skills, values.)	RMI Quality Committee
	RMI Quality Committee	Ways Statistical.	The last month of the semester	All faculty member	PLOs (knowledge, Skills, values.)	RMI Quality Committee .

Approved in department Council No (15) , 10/08/1442 H