



# Program Specification





T-103  
2022

## Program Specification

Program Name: Master of Data Science

Program Code (as per Saudi university ranking): *Enter Program Code.*

Qualification Level: Postgraduate (Master)

Department: Information Systems

College: College of Computer Engineering and Science

Institution: Prince Sattam Bin Abdulaziz University

Program Specification: New  updated\*

Last Review Date: 02/26/2023



## Content:

Content	Page
A. Program Identification and General Information	3
B. Mission, Objectives, and Program Learning Outcomes	4
C. Curriculum	5
D. Student Admission and Support:	7
E. Faculty and Administrative Staff:	8
F. Learning Resources, Facilities, and Equipment:	9
G. Program Quality Assurance:	10
H. Specification Approval Data:	11



## A. Program Identification and General Information

### 1. Program's Main Location :

Prince Sattam Bin Abdulaziz University, Al-Kharj (city)

### 2. Branches Offering the Program (if any):

Male and Female campus, Al-Kharj (city)

### 3. Partnerships with other parties (if any) and the nature of each:

Partnership Arrangement: N/A  
Type of Partnership: N/A  
Duration of Partnership: N/A

### 4. Professions/jobs for which students are qualified

Based on specific, precise, and set requirements of the MSc in Data Science, the primary and most important jobs for graduate in the program are in:

- (a) Statistics and Analysis Institutions.
- (b) E-Marketing Organizations.
- (c) Insurance Organizations.
- (d) Health Institutions.
- (e) Social Media Organizations.
- (f) Professional Services Organizations.
- (g) Businesses and startups.
- (h) Pharmaceutical Organizations.
- (i) Information Technology Organizations.
- (j) Educational and Research Institution

### 5. Relevant occupational/ Professional sectors:

All governmental and private sectors, such as:

- The financial and banking services sector
- Energy sector
- The communications and technology sector
- Health services sector
- The educational services sector
- Consumer service sector
- Utilities sector
- Basic resources sector
- The agricultural and industrial sector

### 6. Major Tracks/Pathways (if any):





Major track/pathway	Credit hours (For each track)	Professions/jobs (For each track)
1. N/A		
2.		
3.		
4.		
<b>7. Exit Points/Awarded Degree (if any):</b>		
exit points/awarded degree	Credit hours	
1. N/A	-	
2.		
3.		
<b>8. Total credit hours: (...63....)</b>		



## B. Mission, Objectives, and Program Learning Outcomes

### 1. Program Mission:

Master of Data Science (MSDS) program mission is to advance the state-of-the-art in data science, transform all fields, professions, & sectors through the application of data science and ensure the responsible use of data to benefit society.

### 2. Program Objectives:

- (a) Making students able to know the concepts, techniques, and applications of data science and know how to make use of them in all sectors (medical, industrial, agricultural, service, and economic sectors).
- (b) Developing students' abilities in managing, analyzing, and mining data.
- (c) Developing student's professional abilities in the recruitment, implementation and management of data and its systems in institutions and businesses.
- (d) Making students able to know the practical, societal, and ethical aspects of data usage and collection.
- (e) Qualifying students to pursue graduate studies and scientific research in the field of data science.

### 3. Program Learning Outcomes\*

#### Knowledge and understanding

K1	Recognize theories of statistics, data visualization, computing, and mathematics appropriate to the data science discipline.
K2	Explain how the exceptionally enormous amounts of data collected by modern organizations can be used to review, redesign, and improve processes
K...	

#### Skills

S1	Analyze existing processes based on interviewing, observation, documentation analysis, and other similar methods.
S2	Implement knowledge of computing, statistics, and mathematics appropriate to the discipline.
S...	

#### Values, Autonomy, and Responsibility

V1	Examine the ethical, professional, and social aspects of Data science and its application.
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V2

V...

\* Add a table for each track or exit Point (if any)





## C. Curriculum

### 1. Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required			
	Elective			
College Requirements	Required			
	Elective			
Program Requirements	Required	9	42	66.66
	Elective	3	15	23.80
Capstone Course/Project		2	6	9.52
Field Training/ Internship				
Residency year				
Others				
<b>Total</b>		<b>14</b>	<b>63</b>	<b>100</b>

\* Add a separated table for each track (if any).

### 2. Program Courses

Complete list of Core and Elective courses:

<https://cces.psau.edu.sa/en/psau/academicprogram/54/2557/5>

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	IS0611	Advanced Data Science	Required		5	Program
	IS0612	Programming for Data Science	Required		5	Program
Level 2	IS0621	Advanced Topics in Database Systems	Required		4	Program
	IS0622	Advanced Data Mining	Required	IS0612	4	Program
Level	IS0631	Data Analysis using Applied Statistics	Required	IS0612	5	Program





Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
3	CS0652	Artificial Intelligence and Deep Learning	Required	IS0612	5	Program
	IS0661	Text Mining	Required	IS0612	5	Program
Level 4	IS0641	Data Visualization	Required	IS0612	4	Program
	IS0655	Web and Cloud Computing	Required	IS0612	5	Program
		<i>Program Elective #1</i>	Elective		5	Program
Level 5	IS0671	Capstone Project1	Required	IS0612	3	Program
		<i>Program Elective #2</i>	Elective		5	Program
Level 6	IS0672	Capstone Project2	Required		3	Program
		<i>Program Elective #3</i>	Elective		5	Program

\* Include additional levels (for three semesters option or if needed).

\*\* Add a table for the courses of each track (if any)

### 3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-104)

Google drive link:

<https://drive.google.com/drive/folders/1MKBk2zK1wdSS7xVIKwnWj4nJCM1iMLjF?usp=sharing>

Blackboard link:

[https://lms.psau.edu.sa/webapps/blackboard/content/listContentEditable.jsp?content\\_id= 2031008\\_1&course\\_id= 137931\\_1](https://lms.psau.edu.sa/webapps/blackboard/content/listContentEditable.jsp?content_id= 2031008_1&course_id= 137931_1)

### 4. 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*).





Course code & No.	Program Learning Outcomes (Core Courses)										
	Knowledge and understanding				Skills				Values, Autonomy, and Responsibility		
	K1	K2	K3	---	S1	S2	S3	---	V1	V2	----
Course <b>IS0611</b>	I	I			I	P			-		
Course <b>IS0621</b>	I	P			P	P			-		
Course <b>IS0612</b>	I	P			P	P			P		
Course <b>IS0622</b>	P	M			P	P			P		
Course <b>IS0631</b>	I	I			P	P			P		
Course <b>IS0641</b>	P	P			P	P			P		
Course <b>CS0652</b>	I	P			P	P			P		
Course <b>IS0661</b>	P	P			P	P			P		
Course <b>IS0655</b>	P	-			I	P			-		
Course <b>IS0671</b>	M	-			M	M			M		
Course <b>IS0672</b>	M	M			M	M			M		

\* Add a separated table for each track (if any).

Course code & No.	Program Learning Outcomes (Elective Courses)										
	Knowledge and understanding				Skills				Values, Autonomy, and Responsibility		
	K1	K2	K3	---	S1	S2	S3	---	V1	V2	----
Course <b>IS0651</b>	I	I			-	P			P		
Course <b>IS0653</b>	I	I			P	P			I		
Course <b>CS0654</b>	P	P			-	P			P		
Course <b>IS0656</b>	P	-			P	P			P		
Course <b>IS0657</b>	P	P			P	P			P		
Course <b>IS0658</b>	P	-			P	P			P		
Course <b>IS0659</b>	P	P			P	P			-		
Course <b>IS0662</b>	P	-			P	P			P		
Course <b>IS0663</b>	P	-			P	P			P		



Course code & No.	Program Learning Outcomes (Elective Courses)										
	Knowledge and understanding				Skills				Values, Autonomy, and Responsibility		
	K1	K2	K3	---	S1	S2	S3	---	V1	V2	----
Course IS0664	P	P			P	P			P		
Course IS0665	P	-			P	P			P		
Course IS0666	P	P			P	P			-		
Course IS0667	P	P			P	P			P		
Course IS0668	P	P			P	P			-		
Course IS0669	P	-			-	P			P		

\* Add a separated table for each track (if any).

## 5. Teaching and learning strategies applied to achieve program learning outcomes.

Describe teaching and learning strategies, including curricular and extra-curricular activities, to achieve the program learning outcomes in all areas.

- [1] The institution has strong procedures in place to provide oversight of quality of teaching and learning.
- [2] Course Specifications, Program Specifications Course Portfolios, along with student advising protocol to indicate that courses taught impart the learning outcomes.
- [3] PSAU has an impressive array of assessment tools (i.e., mentioned in *section 6*) to provide annual data on achievement of learning outcomes.
- [4] Teaching and learning strategies (*include but not limited to*): Lectures, Seminars, Group Discussions, Case Studies, Website searches, Advanced topics in database, IT strategic plan, data driven project management, Programming, and data analysis sessions, solving problems, Group Work, Independent work, Simulation Analysis, Problem-based Learning, Self-learning topics, Lab sessions, presentations, Brainstorming.

## 6. Assessment Methods for program learning outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.

The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least twice in the bachelor program's cycle and once in other degrees).

### Direct measures:

Capstone course, Comprehensive exams, Assignments, Quizzes, Programming based practical evaluation, Individual and Group Projects.

### Indirect measures:





Student surveys, focus group discussions, job placement data, exit interviews, alumni surveys, tracking of alumni awards and achievements, employer surveys, graduate school acceptance rates.

- Since not all outcomes need to be assessed every year, program has planned to follow a schedule for assessing all learning outcomes over time to ensure that the appropriate evidence is collected.
- Information gained from learning outcomes assessment is curricular not only to improve programs, but also as a rationale for curriculum changes.





## D. Student Admission and Support:

### 1. Student Admission Requirements

#### Admission Requirements

- In addition to the admission conditions stated in the unified regulation roles for graduate studies in Saudi universities (role 13), the applicant must:
- Hold a bachelor's degree in Information Systems, Computer Science, Computer Engineering, Software Engineering, Information Technology, or a related field with a minimum cumulative GPA of 3.5 out of 5 (or equivalent).
- Obtain 60 or more in the TOEFL-IBT or 5.5 or more in IELTS exam or pass a language level test determined by the English language department of the university in agreement with department.

#### Transfer Requirements & Course Equivalency

Student transfer to the program from another recognized university may be accepted upon the recommendation of the departmental and college councils and the approval of the council of the Deanship of Post-graduate Studies considering the following:

- 1) Admission requirements are provided for the transferred student and any other requirements deemed necessary by the department.
- 2) That the student is not expelled from the university from which he was transferred for any reason.
- 3) The number of academic units studied may be calculated according to the following:
  - Studies for the equivalent units should not have passed more than two semesters.
  - Conform with the requirements of the program being referred to.
  - The percentage of these units shall not exceed thirty percent of the units of the transferred program.
  - His/her rating in the equivalent units should not be less than (Very Good).
  - Equivalent units are not included in the GPA calculation.

The equation shall be upon the recommendation of the department council that follows the course and the approval of the college council and the deanship of post-graduate studies.

### 2. Guidance and Orientation Programs for New Students

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

The department provides an introduction to the students and connect them to the department chairperson via electronic methods so that they can contact the person directly for any issues, suggestions, or concerns.

### 3. Student Counseling Services

(Academic, professional, psychological and social)

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

Prince Sattam bin Abdulaziz University (PSAU) made available a collection of guides and booklets for the students clarifying useful regulations and how to perform various activities throughout their



lifetime in the university. In addition to that, the College of Computer Engineering and Science (CCES) published its college guide that tells the student the main facts about the university and college and summarizes the study plans for each program as well as the main point of PSAU regulations. Any updates are published for the students in either CCES website, using an online E learning platform, and in signs posted in the building where students typically take classes; this includes traditional boards and electronic screens. Urgent announcements are sent directly to students' cell phones. At the beginning of their academic journey in CCES, a student is assigned a faculty member who will be their academic advisor. The roles of both student and the academic advisor are described in PSAU publications such as the Academic Advisor (i.e., coordinator) for the University Student guide.

During Faculty/staff-student communication, we encourage students to explore:

- Goal setting and stress management.
- Personal development and building self-confidence.
- Overcoming addictions and unhealthy habits by guiding individuals to get help from outside sources (such as specialized help).
- Learning and academic skills challenges.
- Coping with career uncertainty.

Students are encouraged to engage in One-to-One conversation with relevant person (faculty or staff), in case of (but not limited to):

- Low academic performance.
- Health issues.
- Relationship Problems.
- Financial Pressures.
- Depression.
- Anxiety.

#### 4. Special Support

(Low achievers, disabled, gifted, and talented students).

A case-by-case may be examined.

- If required, a low achiever is provided extra-curricular teaching hours in the areas of their weakness.
- Gifted and talented students are provided with more opportunities to excel, and recommendation letters are completed for them if requested.

The faculty and staff will help special needs students to:

- Increase motivation to complete academic work.
- Improve time management skills.
- Managing test anxiety.
- Strengthening test preparation strategies.
- Decreasing procrastination.
- Better note-taking skills

The information systems department considers the following as disabilities and will refer students for psychological counseling in case of necessary need:

- visual or hearing impairments.
- impaired mobility.
- learning disabilities.
- psychological disabilities.
- chronic illness.





## E. Faculty and Administrative Staff:

### 1. Needed Teaching and Administrative Staff

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professor	Information Systems	Data Science		1	1	2
Associate Professor	Information Systems	Data Science	Data Mining	2	2	4
Assistant Professor	Information Systems	Data Science	Data Visualization/ Data Analysis/ Databases	2	2	4
Lecturer						
Teaching Assistant						
Technicians and Laboratory Assistant	Information Systems	Data Science		2	2	4
Administrative and Supportive Staff						
Others (specify)						



## F. Learning Resources, Facilities, and Equipment:

### 1. Learning Resources

Learning resources required by the Program (textbooks, references, and e-learning resources and web-based resources, etc.)

Learning materials are important because they can significantly increase student achievement by supporting student learning. This process aids in the learning process by allowing the student to explore the knowledge independently as well as providing repetition. College provides the following means to faculty and students to train and gain knowledge.

- Text books.
- Educational videos.
- Digital learning resources including video, audio, text, and images.
- Lectures (via Smart Boards, Blackboard Ultra, Polycom HD video conferencing solution)
- Simulation. This resource aids faculty's explanation, and allows learners to test out their ideas and experiment.
- Electronic textbook (SDL.edu.sa via <https://lms.psau.edu.sa/>)
- Learning Management System (Blackboard)

### 2. Facilities and Equipment

(Library, laboratories, classrooms, etc.)

- College provides all faculty members with laptops and installed software for smart boards.
- College has computer labs and libraries so that all the students of the program are associated to the use of Internet, books they need, hardware and software they require to train themselves.
- The college provided each college member with Internet access to gain knowledge from world resources.
- The IS Department organizes some technical workshops among faculty members about how to use some of the sites to improve e-learning.
- State-of-art Library is accessible by both student's college faculty at building number 13.

### 3. Procedures to ensure a healthy and safe learning environment

(According to the nature of the program)

All the labs and classrooms are fully equipped with ventilation and air-conditioned system which provides fully hygienic and healthy environment to the students and faculty to teach and train. Fire alarms and fire hose reels are also installed to keep the lives of teachers/students safe.

## G. Program Quality Assurance:

### 1. Program Quality Assurance System

Department is intended benchmark University PQA system to assure 'program quality'

<https://ddq.psau.edu.sa/ar/page/1-247>

### 2. Procedures to Monitor Quality of Courses Taught by other Departments

The 'postgrad studies committee' should periodically review randomly chosen files and author a report to the dean about the quality of the academic advising at the college.







### 3. Procedures Used to Ensure the Consistency between Main Campus and Branches (including male and female sections).

Consistency between Main Campus and Branches can be ensured if College of Computer Engineering and Sciences:

- Design, along with the program directors and in coordination with the rest of the organization, a standard strategy of communication and specific actions that strengthens and assures ties between collaborating lecturers in male and female
- The department administrators take part in the coordination to assure the execution of teaching and administrative management processes defined in the department.
- Internal assessing of the results for the academic year.
- Monitoring department-related activities (teaching, research, and dissemination)
  - Questionnaires.
  - Reports
  - Statistical reports
  - Course evaluation
  - Program evaluation

### 4. Assessment Plan for Program Learning Outcomes (PLOs),

To:

- 1) Ensure that CLOs are assessed every course offering.
- 2) Review and approve the CLOs assessment files and analysis reports.
- 3) Develop and maintain sustainable PLO assessment plans.
- 4) Ensure that all PLOs are periodically assessed as per the assessment plan.
- 5) Identify appropriate assessment tools (direct and indirect) for each PLO, and develop effective rubrics to measure their attainment levels.
- 6) Collect and verify PLO assessment data, and generate the PLO assessment files.
- 7) Ensure that the assessment loop is closed (i.e., discovered deficiencies are addressed with appropriate remedial actions), and documented.
- 8) Implement and maintain a repository for all the department assessment related documents.

Process.	Level	Tools	Elements	Responsibility	Time
Quality evaluation	Course's level	Course report	Exam Marks Course Evaluation Survey Course Learning Outcomes (CLOs) assessment (direct and indirect assessment)	All instructors and quality committee	End of each semester





	Stakeholders	Surveys	Student's survey Faculty survey Alumni Survey Employer survey	Quality unit	Annually
	Program level	Annual Program Report (APR)	<ul style="list-style-type: none"> <li>▪ Course reports</li> <li>▪ Program Learning Outcomes (PLOs) assessment.</li> <li>▪ Program Exit Survey</li> <li>▪ Indicators</li> <li>▪ Statistical data</li> </ul>	Curriculum and Assessment (CAC) Committee	Annually
Quality planning	Course's level	Course Improvement action plan	Based on course report	Quality committee	End of each semester
	Program level	Program Improvement action plan	Based on APR	CAC Committee	Annually
Quality implement action	Course level, program level and all college units are committed to implement the approved action plan.				
Quality rechecks	Course's level	Next course report	Evaluate results of action plans	Quality committee	Annually
	Program level	Next APR	Evaluate results of action plans	CAC Committee	Annually

The College has developed software as a standardized Excel sheet to be used as the direct and indirect assessment instrument to assess the PLOs.

The direct assessment is based on the score obtained by the student in a specific work such as Midterm exam, Final exam, quizzes, home works, or project. Based on the score obtained, four levels of satisfaction of outcome achievement have been defined as follows:

Unsatisfactory	is given to a student whose score is less than 60%.
Developing	is given to a student whose score is between 60% and 70%.
Satisfactory	is given to a student whose score is between 70% and 90%.



Outstanding	is given to a student whose score is above 90%.
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On the other hand, the indirect assessment is accomplished through a CLOs survey (Course Evaluation Survey) conducted with students at the end of semester. The four levels of satisfaction are defined as below:

Unsatisfactory	corresponds to Disagree (2) + Strongly Disagree (1) in a specific CLO
Developing	corresponds to Neutral (3) in a specific CLO.
Satisfactory	corresponds to Agree (4) in a specific CLO
Outstanding	corresponds to “Strongly Agree” (5) in a specific CLO

Using the core courses and mapping between CLOs and PLOs, for both direct and indirect assessments, the attainment of PLO based on the percentage of students achieving the satisfactory and outstanding levels in CLOs is judged, based on 70% target, as follows:

Exceeds Expectations (EE)	if PLO is attained by 80% or more of students.
Meets Expectations (ME)	if PLO is attained by 70% to 80% of students.
Progressing Towards Expectations (PE)	if PLO is attained by 60% to 70% of students.
Does Not Meet Expectations (DNME)	if PLO is attained by 60% or less of students,

Thus, the assessment of all PLOs for the program (based on the core courses) can be evaluated within the program cycle (2 years), which can be reported and discussed at the Curriculum and Assessment Committee (CAC) and hence used as a feedback for developing and improving the program in the next cycle.

## 5. Program Evaluation Matrix

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Effectiveness of teaching	Leaders, Students, Alumina, Teaching Staff	Survey, Class Observation	End of academic year
Learning resources	Teaching Staff, Students	Survey	End of academic year
Leadership	Teaching Staff, Students	Survey	End of academic year
Effectiveness of program	Alumina, Graduate Employers	Survey	End of academic year

**Evaluation Areas/Aspects** (e.g., leadership, effectiveness of teaching & assessment, learning resources, services, partnerships, etc.)

**Evaluation Sources** (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others.)

**Evaluation Methods** (e.g., Surveys, interviews, visits, etc.)

**Evaluation Time** (e.g., beginning of semesters, end of the academic year, etc.)





## 6. Program KPIs\*

The period to achieve the target (two) year(s).

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-PG-1	Percentage of achieved indicators of the program operational plan objectives	95%	Percentage of performance indicators of the operational plan objectives of the program that have achieved the targeted annual level to the total number of indicators targeted for these objectives in the same year	End of academic year (annual)
2	KPI-PG-2	Students' Evaluation of quality of learning experience in the program	3.75	Average of overall rating of final year students for the quality of learning experience in the program on a five-point scale in an annual survey	End of program cycle (final year)
	KPI-PG-3	Students' evaluation of the quality of the courses	3.75	Average students' overall rating of the quality of courses on a five- point scale in an annual survey.	End of academic year (annual)
	KPI-PG-4	Students' evaluation of the quality of scientific supervision	4	Average students' overall rating of the quality of scientific supervision on a five-point scale in an annual survey.	End of academic year (annual)
	KPI-PG-5	Average time for students' graduation	4	Average time (in semesters) spent by students to graduate from the program.	End of program cycle (graduation time)
	KPI-PG-6	Rate of students dropping out of the program	0%	Percentage of students who did not complete the program to the total number of students in the same cohort	End of program cycle (graduation time)





	KPI-PG-7	Graduates' employability	90%	Percentage of graduates from the program who within a year of graduation were employed to the total number of graduates in the same year	One year after graduation
	KPI-PG-8	Employers' evaluation of the program graduates' competency	3.75	Average of overall rating of employers for the competency of the program graduates on a five-point scale in an annual survey	One year after employment time
3	KPI-PG-9	Student's satisfaction with provided services	3.75	Average of student's satisfaction rate with the numerous services provided by the program (food, transportation, sport facilities, academic advising, ...) on a five-point scale in an annual survey	End of academic year (annual)
4	KPI-PG-10	Ratio of students to faculty members	5:1	Ratio of the total number of students to the total number of full-time and full-time equivalent faculty members participating in the program	End of academic year (annual)
	KPI-PG-11	Percentage of faculty members' distribution based on academic ranking	Prof: 22.9% Assoc.: 22.9% Assist: 54.1%  Male: 66.7% Female: 33.3%	Percentage distribution of faculty members participating in the program based on academic ranking.	End of academic year (annual)
	KPI-PG-12	Proportion of faculty members leaving the program	0%	Proportion of faculty members leaving the program annually for reasons other than age retirement to the total number of faculty members	End of academic year (annual)
5	KPI-PG-13	Satisfaction of beneficiaries with learning resources	3.75	Average of beneficiaries' satisfaction rate with learning resources	End of academic year (annual)





				on a five-point scale in an annual survey in terms of: Their adequacy and diversity (references, journals, databases... etc.) The support services provided for their utilization.	
	KPI-PG-14	Satisfaction of beneficiaries with research facilities and equipment	3.75	Average of beneficiaries' satisfaction rate with research facilities and equipment (depending on the nature of the program) on a five-point scale in an annual survey.	End of academic year (annual)
6	KPI-PG-15	Percentage of publications of faculty members	75%	Percentage of faculty members participating in the program with at least one research publication during the year to total faculty members in the program.	End of academic year (annual)
6	KPI-PG-16	Rate of published research per faculty member	2:1	The average number of refereed and/or published research per each faculty member participating in the program during the year (total number of refereed and/or published research to the total number of faculty members during the year)	End of academic year (annual)
	KPI-PG-17	Citations rate in refereed journals per faculty member	2:1	The average number of citations in refereed journals from published research (total number of citations in refereed journals from published research for faculty members to the total published research)	End of academic year (annual)





	KPI-PG-18	Percentage of students' publication	10%	Percentage of students who: a. published their research in refereed journals b. presented papers in conferences to the total number of students in the program during the year.	End of academic year (annual)
	KPI-PG-19	Number of patents, innovative products, and awards of excellence	1	Number of: a. Patents and innovative products b. National and international excellence awards obtained annually by the students and staff of the program.	End of academic year (annual)

1	Mission and Goal
2	Teaching and Learning
3	Students
4	Faculty Members
5	Learning Resources, Facilities, and Equipment
6	Research and Projects

\* Including KPIs required by NCAAA

## H. Specification Approval Data:

COUNCIL / COMMITTEE	
REFERENCE NO.	
DATE	

