هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA
T3
2020

Program Specification

Program Name: Bachelor of Science in Mathematics
Qualification Level: Bachelor
Department: Mathematics
College: Science
Institution: King Khalid University

Content

A. Program Identification and General Information

1. Program Main Location:
King Khalid University, main campus, Guraiger
2. Branches Offering the Program:
Branch 1. Female Branch, King Abdullah Rd. Campus
3. Reasons for Establishing the Program: (Economic, social, cultural, and technological reasons, and national needs and development, etc.)
An information- and technology-based society like the Kingdom requires individuals, who can think critically about complex issues, analyze, and adapt to new situations, solve problems of various kinds, and communicate their thinking effectively. The study of mathematics equips students with knowledge, skills, and habits of mind that are essential for successful and rewarding participation in such a society. To learn mathematics in a way that serves them well throughout their lives, students need classroom experiences that help them to develop mathematical understanding; learn important facts, skills, and procedures; develop the ability of mathematical logical thinking; and acquire a positive attitude towards mathematics. **Reasons:** • Broad demand for highly qualified individuals by the Saudi society and the economic growth in both sectors, private and public. • Increasing urgent need for mathematics teachers in the stream of education. • Cope with the global technical development needs for highly qualified individuals.
4. Total Credit Hours for Completing the Program: (126)
5. Professional Occupations/Jobs: • College and school education stream. • Teaching assistant in Saudi universities. • Research assistant in research institutions requiring mathematical skills. • Postgraduate students in Saudi or foreign universities.

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

Major track/pathway	Credit hours (For each track)	Professional Occupations/Jobs (For each track)
1. Nil	Nil	Nil
2.		
3.		
4.		

7. Intermediate Exit Points/Awarded Degree (if any)**:**

Intermediate exit points/awarded degree	Credit hours
1. Nil	Nil
2.	
3.	

B. Mission, Goals, and Learning Outcomes

1. Program Mission:

Graduating well-qualified individuals, who use mathematical critical thinking to face complex issues, analyze, and adapt to new situations, solve problems of various kinds, and communicate their thinking effectively to serve society.

2. Program Goals:

- Qualifying graduates specialized in Mathematics.
- Preparing graduates to endeavor in teaching for public education.
- Developing logical thinking and IT skills in Mathematics.
- Embracing distinguished local candidates for academic rehabilitation to postulate for MSc and PhD.

3. Relationship between Program Mission and Goals and the Mission and Goals of the Institution/College.

As a subject area, mathematics and science involves a rich variety of competencies and fields of knowledge (arithmetic, algebra, biology, chemistry, geometry, physics, etc.) that complement one another. In addition, it can be related to the other dimensions of the Saudi Education Program. Hence, the subject-specific competencies developed in studying mathematics and science can be closely related to the cross-curricular competencies in the Saudi Education Program. These subjects provide a context that suitable for the practical use of these cross-curricular competencies. The focuses of development associated with all the broad areas of learning represent different ways of identifying issues that students can examine and address by drawing on their subject-specific knowledge. In this way, students will be better able to appreciate the role and contribution of mathematics, science, and technology in various fields of human activity.

4. Graduate Attributes:

Graduate attributes for which BSc in Mathematics students are prepared are as follow:

- Profound background in undergraduate level mathematics.
- Use appropriate knowledge and skills to identify, formulate, analyze, and solve complex scientific problems.
- Work effectively either independently or as a member of a team.
- Communicate effectively both orally and in writing.
- Apply professional ethics, accountability, and equity using their knowledge in modern industry or teaching, or secure acceptance in high-quality graduate programs in mathematics and other fields.
- Able to identify and address his own educational needs to maintain competence for adapting to new needs and environment.

5.Program learning Outcomes*

Knowledge and Understanding	
K1	Memorize related mathematical definitions, hypothesis, and theorems.
K2	State different methods of mathematical proofs.
K3	Write mathematical procedure to solve some mathematical problems.
K4	Recognize some applications of mathematics and statistics.
Skills	
S1	Use definitions and theorems to solve problems.
S2	Justify logically and mathematically the solving steps.
S3	Link different knowledge and skills in the program.
S4	Formulate mathematical models for some practical issues.
S5	Enhance the ability to self-learning and eLearning and acquire effective communication skills
S6	Work effectively, both independently and as a part of group.
S7	Use some mathematical and statistical software in solving problems.

Values	
V1	Adhere to Islamic values and excellence in professional practices.
V2	Able to articulate awareness of and demonstrate personal characteristics that positively impact the learning process.
V3	Take full responsibility for initiating, identifying, amending, and achieving aims.

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

C. Curriculum

1. Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	8	17	13.5
	Elective	0	0	0
College Requirements	Required	6	24	19
	Elective	0	0	0
Program Requirements	Required	28	82	65.1
	Elective	0	0	0
Capstone Course/Project		1	3	2.4
Field Experience/ Internship		0	0	0
Others		0	0	0
Total		43	126	100

* Add a table for each track (if any)

2. Program Study Plan

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
Level 1	011ENG-6	Intensive English Program 1	Required		6	College
	101BIOL-4	General Biology	Required		4	College
	101MATH-3	Calculus - 1	Required		3	College
	111ICI-2	The Entrance to the Islamic Culture	Required		2	University
Level 2	101CMS-3	Computer Science	Required		3	University
	101PHYS-4	Introduction to Physics	Required		4	College
	101CHEM-4	General Chemistry - 1	Required		4	College
	110NGL-3	Scientific English for Science Students	Required	011ENG-6	3	College
	112ICI-2	Islamic Culture - 2	Required		2	University
	201ARAB-2	Arabic Language Skills	Required		2	University
Level 3	102CMS-2	Computation Skills 2	Required	101CMS-3	2	Department
	113ICI-2	Islamic Culture - 3	Required		2	University
	202MATH-3	Calculus 2	Required	101MATH-3	3	Department
	202ARAB-2	Arabic Editing	Required		2	University
	211STAT-3	Principles of Statistics & Probability	Required		3	Department
	232MATH-3	Foundations of Mathematics	Required	101MATH-3	3	Department
Level 4	114ICI-2	Islamic Culture 4	Required		2	University
	203MATH-3	Calculus 3	Required	202MATH-3	3	Department
	212STAT-3	Mathematical Statistics	Required	211STAT-3	3	Department
	242MATH-3	Linear Algebra 1	Required	232MATH-3	3	Department
	251MATH-2	Programming for Mathematics	Required	101CMS-3 102CMS-3	2	Department
	263MATH-3	Introduction to Differential Equations	Required	202MATH-3	3	Department
Level 5	304MATH-3	Vector Analysis	Required	203MATH-3	3	Department
	322MATH-3	Real Analysis 1	Required	203MATH-3	3	Department

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
	343MATH-3	Linear Algebra 2	Required	242MATH-3	3	Department
	344MATH-3	Number Theory	Required	232MATH-3 242MATH-3	3	Department
	361MATH-3	Applied Mathematics	Required	202MATH-2	3	Department
Level 6	313STAT-3	Probabilities Theory 1	Required	211STAT-3 203MATH-3	3	Department
	323MATH-3	Real Analysis 2	Required	322MATH-3	3	Department
	345MATH-3	Group Theory	Required	232MATH-3 344MATH-3	3	Department
	352MATH-3	Numerical Analysis	Required	242MATH-3 263MATH-3	3	Department
	363MATH-3	Mathematical Methods	Required	263MATH-3 343MATH-3	3	Department
Level 7	423MATH-3	Functions of Complex Variables	Required	203MATH-3 322MATH-3	3	Department
	445MATH-3	Rings and Fields	Required	345MATH-3	3	Department
	464MATH-3	Theory of Differential Equations	Required	263MATH-3 343MATH-3	3	Department
	481MATH-3	Introduction to Topology	Required	322MATH-3	3	Department
	490MATH-2	Special Subjects	Required	322MATH-3	2	Department
	491MATH-3	Research Project	Required	313STAT-3 322MATH-3 345MATH-3 363MATH-3	3	Department
Level 8	414STAT-3	Probabilities Theory 2	Required	323MATH-3 313STAT-3	3	Department
	424MATH-3	Analysis in Several Variables	Required	323MATH-3	3	Department
	432MATH-3	Introduction to Graphs Theory & Combinatorics	Required	344MATH-3	3	Department
	453MATH-3	Mathematical Programming	Required	203MATH-3	3	Department
	472MATH-3	Differential Geometry	Required	203MATH-3 263MATH-3	3	Department

* Include additional levels if needed.
** Add a table for each track (if any)

3. Course Specifications

Insert hyperlink for all course specifications using NCAAA template

- 011ENG-6 Intensive English Program 1
- 101BIOL-4 General Biology
- 101MATH-3 Calculus - 1
- 111ICI-2 The Entrance to the Islamic Culture
- 101CMS-3 Computer Science
- 101PHYS-4 Introduction to Physics
- 101CHEM-4 General Chemistry - 1
- 110NGL-3 Scientific English for Science Students
- 112ICI-2 Islamic Culture - 2
- 201ARAB-2 Arabic Language Skills
- 102CMS-2 Computation Skills 2
- 113ICI-2 Islamic Culture - 3
- 202MATH-3 Calculus 2
- 202ARAB-2 Arabic Editing
- 304MATH-3 Vector Analysis
- 322MATH-3 Real Analysis 1
- 343MATH-3 Linear Algebra 2
- 344MATH-3 Number Theory
- 361MATH-3 Applied Mathematics
- 313STAT-3 Probabilities Theory 1
- 323MATH-3 Real Analysis 2
- 345MATH-3 Group Theory
- 352MATH-3 Numerical Analysis
- 363MATH-3 Mathematical Methods
- 423MATH-3 Functions of Complex Variables
- 445MATH-3 Rings and Fields
- 464MATH-3 Theory of Differential Equations
- 481MATH-3 Introduction to Topology
- 490MATH-2 Special Subjects
- 491MATH-3 Research Project

- 211STAT-3 Principles of Statistics & Probability
- 232MATH-3 Foundations of Mathematics
- 114ICI-2 Islamic Culture 4
- 203MATH-3 Calculus 3
- 212STAT-3 Mathematical Statistics
- 242MATH-3 Linear Algebra 1
- 251MATH-2 Programming for Mathematics
- 263MATH-3 Introduction to Differential Equations
- 414STAT-3 Probabilities Theory 2
- 424MATH-3 Analysis in Several Variables
- 432MATH-3 Introduction to Graphs Theory & Combinatorics
- 453MATH-3 Mathematical Programming
- 472MATH-3 Differential Geometry

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)**

Levels	Course code & No.	Program Learning Outcomes													
		Knowledge				Skills							Competence		
		K1	K2	K3	K4	S1	S2	S3	S4	S5	S6	S7	C1	C2	C3
Level 1	101MATH-3	I	I	I		I	I	I	I	I	I	I	I	I	I
Level 3	202MATH-3	I	I	I	I	I	I	I	I		I	I	I	I	I
	211STAT-3	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	232MATH-3	I	I	I		I	I	I	I		I	I	I	I	I
Level 4	203MATH-3	I	I	I		I	I	I	I		I	I	I	I	I
	212STAT-3	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	242MATH-3	I	I	I	I	I	I	I	I		I	I	I	I	I
	251MATH-2			I	I		I	I	I	I	I	I	I	I	I
	263MATH-3	P	P	P		P	P	I	I		P	P	P	P	P
Level 5	304MATH-3	P	P	P	I	P		I	I		P	P	P	P	P
	322MATH-3	P	P	P	I	P	P	I	I		P	P	P	P	P
	343MATH-3	P	P	P		P	P	P			P	P	P	P	P
	344MATH-3	P	P	P	I	P	P	I	I	P	P	P	P	P	P
	361MATH-3	P	P	P		P	P	I	P		P	P	P	P	P
Level 6	313STAT-3	M	M	P			M	P			M	M	M	M	M
	323MATH-3	M	M		P	M	M	P			M	M	M	M	M
	345MATH-3	M	M			M	M	P	P		M	M	M	M	M
	352MATH-3	M	M	P	P	M	M	P	P	M	M	M	M	M	M
	363MATH-3	M	M	P	M	M		P	P		M	M	M	M	M
Level 7	423MATH-3	M	M	P	P	M	M	P	P		M	M	M	M	
	445MATH-3	M	M	P	P	M	M	P			M	M	M	M	M
	464MATH-3	M	M	P	P	M	M	P	P	M	M	M	M	M	M
	481MATH-3	M	M	P	P	M	M	P			M	M	M	M	M
	490MATH-2	M	M	P	P	M	M	P	P		M	M	M	M	M
	491MATH-3	M	M	M	M		M	P	P	M	M	M	M	M	M
Level 8	414STAT-3	M	M	P	P	M	M	P	P	M	M	M	M	M	M
	424MATH-3	M	M	P	P	M	M	P	P		M	M	M	M	M
	432MATH-3	M	M	P	P	M	M	P	P	M	M	M	M	M	M
	453MATH-3	M	M	P	M	M	M	P	P	M	M	M	M	M	M
	472MATH-3	M	M	P	P	M	M	P	P		M	M	M	M	M

* Add a table for each track (if any)

5. 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.

Lectures, Seminars, Practical, Cooperative learning, Independent studies, Problem solving, teaching practices (as a model), Presentations, University extra-curricular activities, Homework, E-learning, group working, lateral thinking, Mind-mapping, Self-learning, Cooperative-learning.

6. Assessment Methods for program learning outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure achievement of program learning outcomes in every domain of learning.
Written, oral and practical tests, Exercises and homework, Discussion, Notes, Preparation of research work using communication and informatic tools, critical assessment, peer assessment, self-assessment.

D. Student Admission and Support:

1. Student Admission Requirements

- Obtaining a high school diploma (less than 5 years since obtention), or its equivalent.
- Entry of the necessary tests for the major.
  $$Qualifying\ percentage = 30\ \%\ GPA\ of\ high\ school + 30\ \%\ Capabilities\ Exam + 40\ \%\ Achievement\ Exam$$
- Obtaining the national identity.

No previous admission to King Khalid University.

2. Guidance and Orientation Programs for New Students

- Forming a committee to welcome new students and explaining the operation of the department and the college.
- Appointing an academic advisor in the department.
- Declaration of office hours for each faculty member.
- Availability of full information about the department and its members and ways to contact them, especially electronically through Blackboard.
- The department's guide is available on the website of the Department.

KKU guides:

- Student's guides
  https://www.kku.edu.sa/sites/default/files/2020-10/Student_Guide.pdf
- Student's rights and duties guides
  https://www.kku.edu.sa/sites/default/files/general_files/pdf/Administration/guide.pdf
- FAQ
  https://faq.kku.edu.sa
- The executive rules for the study regulations and exams
  https://dar.kku.edu.sa/sites/dar.kku.edu.sa/files/general_files/files/laeha.pdf
- Electronical services guide
  https://bit.ly/3dodwuA

Ethical framework
https://www.kku.edu.sa/portfolio/5264

3. Student Counseling Services

(academic, career, psychological and social)

- Assign a **program coordinator**.
- Assign an academic advisor from faculty members for each group of students from the enrollment until graduation.
- Monitoring the academic performance of students through the Academic Guidance Unit in the Department.
- Provide students with the necessary advice on specialization and employment after graduation, providing personal, social, and educational counseling, and contribute to the development of appropriate solutions to academic problems encountered by students.
- Will continuously monitor and evaluate the program.
- Assign specific office hours in each faculty member's weekly schedule and announce them in a clear and dedicated place for students to provide academic assistance and guidance.
- The Department is committed to the Student Rights Policy approved by the King Khalid University.

The establishment of the Academic Guidance and Student Affairs Committee in the Department, whose task is to study students' complaints and find appropriate solutions.

4. Support for Special Need Students
(low achievers, disabled, gifted and talented)

The Department is committed to the Special Need Student Rights Policy approved by the King Khalid University.

Student's rights and duties guides
https://www.kku.edu.sa/sites/default/files/general_files/pdf/Administration/guide.pdf

E. Teaching and Administrative Staff

1. Needed Teaching and Administrative Staff

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professors	--	6	Analysis Algebra Applied Mathematics Statistics and Probability	4	2	6
Associate Professors	--	8		6	2	8
Assistant Professors	--	26		18	8	26
Lecturers	--	--	--	--	--	--
Teaching Assistants	--	--	--	--	--	--
Technicians and Laboratory Assistants	--	--	2 ITs	1	1	2
Administrative and Supportive Staff	--	--	3	2	1	3
Others (specify)	--	--	--	--	--	--

2. Professional Development

2.1 Orientation of New Teaching Staff
Describe briefly the process used for orientation of new, visiting and part-time teaching staff

- Introductory meetings at the beginning of each semester.
- Distribution of leaflets and brochures on the program to faculty members.
- Utilize the expertise of the experienced and efficient faculty members.
- Holding periodic meetings to encourage the interaction of new faculty members in the department.

2.2 Professional Development for Teaching Staff
Describe briefly the plan and arrangements for academic and professional development of teaching staff (e.g., teaching & learning strategies, learning outcomes assessment, professional development, etc.)

- Organizing training courses to develop teaching skills for faculty members in coordination with the Vice-Presidency for Development and Quality.
- The allocation of part of the meetings of the Board of the department to showcase the pilot and creative experiences of faculty members.
- Conducting internal panels on teaching and evaluation skills.
- New faculty members attend lectures of distinguished members as an experiences' exchange.

F. Learning Resources, Facilities, and Equipment

1. Learning Resources.
Mechanism for providing and quality assurance of learning resources (textbooks, references and other resource materials, including electronic and web-based resources, etc.)

- Coordinating with the Deanship of Library Affairs to provide books, references, and e-learning resources in the field of specialization.

- The use of books and references appropriate to the content with the description of the courses, with the continuous update of those references periodically by the educational committee in the department.
- Encouraging the translation of specialized books and supporting joint authoring between members of the department and members of the same specialization in other Saudi colleges and universities.

2. Facilities and Equipment
(Library, laboratories, medical facilities, classrooms, etc.).

Coordinate with the Deanship of the college to provide the required laboratories, studios, and classrooms.

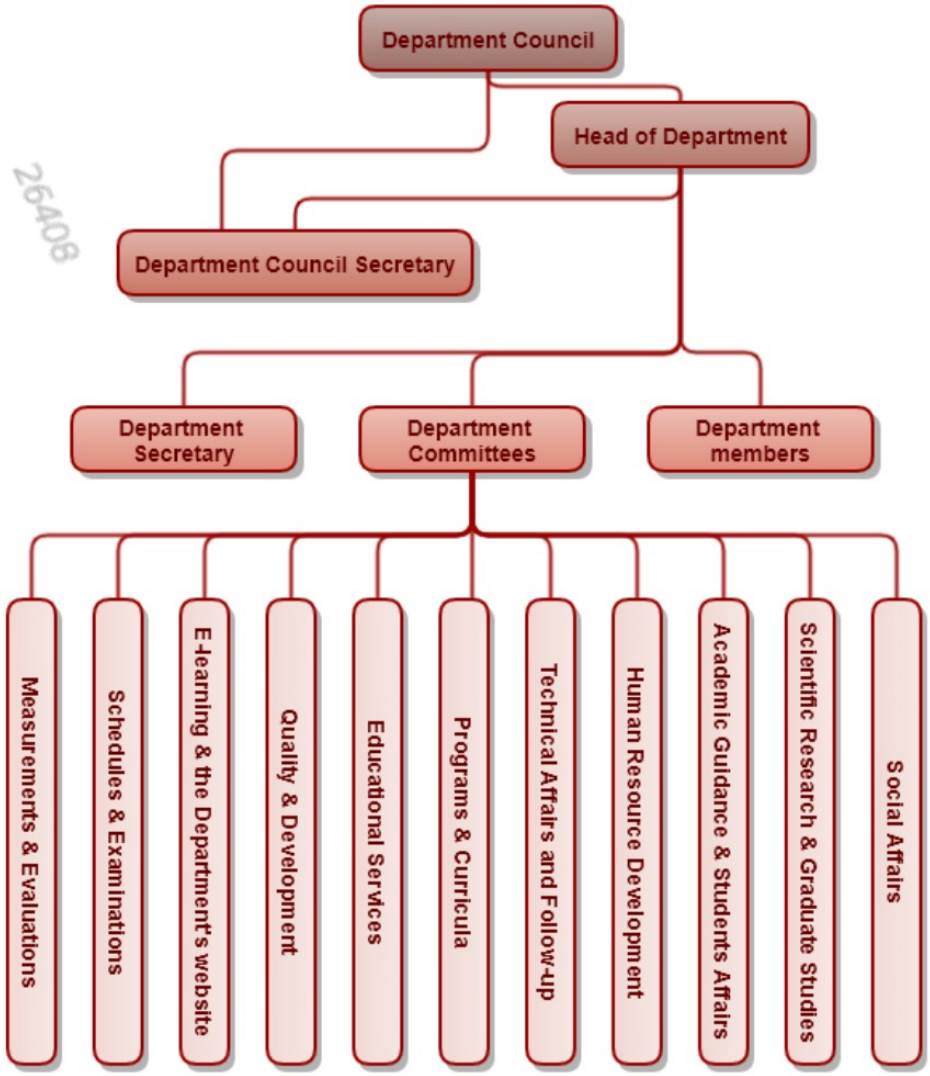
3. Arrangements to Maintain a Healthy and Safe Environment (According to the nature of the program)

The department is committed to the Healthy and Safe Environment Policy approved by the University.

G. Program Management and Regulations

1. Program Management

1.1 Program Structure
(including boards, councils, units, committees, etc.)



1.2 Stakeholders Involvement Describe the representation and involvement of stakeholders in the program planning and development. (students, professional bodies, scientific societies, alumni, employers, etc.)
• Information and data obtained from evaluation of surveys. • Graduate Studies Committee assesses the extent to which learning outcomes are achieved in the program. • An annual test to measure student levels in each section of students separately. • Report and evaluation of employers for graduates. • Prepare and review various evaluation models. • Identify timetables for evaluations. • The quality committee in the department follows up the evaluation and quality evaluation processes in the program. • Studying the proposals submitted by students, graduates, and employers to improve the program.
2. Program Regulations Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)
The department of Mathematics is committed to the **List of Students Rights and Duties** adopted by the University. http://bit.do/eQJt3

H. Program Quality Assurance

1. Program Quality Assurance System Provide online link to quality assurance manual
The department of Mathematics is committed to the King Khalid University Quality Standards **https://quality.kku.edu.sa/ar/publications**
2. Program Quality Monitoring Procedures
• Courses' reports • Program's reports • Survey the opinion of the student of the last year (level 7 & level 8) in the program. • Survey the opinion of the graduates. • Coordination with quality and development center at the faculty
3. Arrangements to Monitor Quality of Courses Taught by other Departments.
The Department will coordinate with these department through quality and development committee.
4. Arrangements Used to Ensure the Consistency between Main Campus and Branches (including male and female sections)
• Coordination between quality and development committees. • Common program coordinator. • Coordination between male and female sections in part of final exams.
5. Arrangements to Apply the Institutional Regulations Governing the Educational and Research Partnerships (if any).
Nil
6. Assessment Plan for Program Learning Outcomes (PLOs), and Mechanisms of Using its Results in the Development Processes
The bachelor committee will collect feedback from: • Results of academic achievement. • Cases of excellence. • Extracurricular activities.

- Self-assessment by the student through an objective evaluation model.
- Evaluation by the Deanship of Academic Development and Quality at the University.
- Evaluation by the National Assessment and Accreditation Authority.
- Evaluation by the Deanship of Student Affairs.
- Review of suggestions from employers to address deficiencies in graduates.

The bachelor committee will use the following strategies:

- Information and data obtained from evaluation models.
- Evaluation by the MSc committee of the department for the extent to which learning outcomes have been achieved in the program.
- Preparation and review of various evaluation models.
- Setting timetables for evaluations.
- The quality and development committee in the department monitors the evaluation and quality of the program.
- Study the proposals submitted by students, graduates, and employers to improve and evaluate the program.

7. Program Evaluation Matrix

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
effectiveness of teaching & assessment	Students and Faculty	Surveys & Interviews	At the end of each semester.
Learning outcomes	Students and Faculty	Surveys & Interviews	At the end of each semester.
Learning resources	Students and Faculty	Surveys & Interviews	At the end of each semester.
Objectives of the operational plan	Students and Faculty	Surveys & Interviews	At the end of each semester.

8. Program KPIs*

The period to achieve the target (4) year.

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
1	KPI-P-01	Percentage of attained objectives of the operational plan.	75%	• Survey of student's opinions. • Survey of teaching staff's opinions.	Graduation of the first batch.
2	KPI-P-02	Students' evaluation of the quality of the learning experiences.	3/5	Survey of student's opinions.	At the end of each academic year.
3	KPI-P-03	Students' evaluation of the quality of the learning experiences in each course.	3/5	Survey of student's opinions.	At the end of each semester.
4	KPI-P-05	Rate of students' retention after the first year.	75%	Students results.	At the end of each 1st year of a batch.
5	KPI-P-08	Percentage of attendance.	80%	Absence sheet.	End of each semester.
6	KPI-P-10	Student satisfaction with the services provided.	3/5	Survey of student's opinions.	Yearly
7	KPI-P-11	Ratio of students to teaching staff	1/1	Numeric comparison	Yearly
8	KPI-P-12	Percentage of faculty distribution by grades	1/5 each	Numeric comparison	Yearly
9	KPI-P-13	Dropout rate of faculty.	<10%	Numeric comparison	Yearly
10	KPI-P-14	Percentage of scientific publication	80%	Ratio of teaching staff publishing 1 paper to the other teaching staff.	Yearly

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
11	KPI-P-15	Ratio of scientific publication to the teaching staff	2 each	Average number of publications.	Yearly
12	KPI-P-16	Citation rate of published research.	10	Average number of citations per published paper.	Yearly
13	KPI-P-17	Students' satisfaction about learning resources.	3/5	Survey of student's opinions.	Yearly

* including KPIs required by NCAAA.

I. Specification Approval Data

Departmental Council / Committee	Department Council
Reference No.	6
Date	21/04/1439

Faculty Council / Committee	Faculty Council
Reference No.	13
Date	08/07/1439