



Program Specification

— (Postgraduate)

Program Name: **Master of Science in Mathematics**

Program Code (as per the Saudi Standard Classification of Educational Levels and Specializations): **020207**

Qualification Level: **7**

Department: **Mathematics**

College: **Science**

Institution: **King Khalid University**

Program Specification: **New** **updated***

Last Review Date: **24/08/2023**

*Attach the previous version of the Program Specification.



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A. Program Identification and General Information:

1. Program's Main Location:

King Khalid University, Graduate Studies Building, King Abdullah Road

2. Branches Offering the Program (if any):

3. System of Study:

Coursework & Research Project

4. Mode of Study:

On Campus-Presential

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

- Partnership Arrangement: **Not Applicable**
- Type of Partnership: **Not Applicable**
- Duration of Partnership: **Not Applicable**

6. Professions/jobs for which students are qualified:

- Banker and financial assistant
- Army research assistant
- Postgraduate studies.
- Lecturer at the university level.
- Teacher in general education.
- Researcher at (graduate) research centers.

7. Relevant occupational/ Professional sectors:

- Education.
- Universities
- Research institutions that require mathematical skills
- Banks and financial institutions
- Statistics centers
- Military institutions associated with industrialization.
- Saudi Central Bank

8. Major Tracks/Pathways (if any):

Major track/pathway	Credit hours (For each track)	Professions/jobs (For each track)
1. Master of Science in Mathematics: Algebra	24+18	
2. Master of Science in Mathematics: Analysis	24+18	



3. Master of Science in Mathematics: Applied Mathematics	24+18	
4. Master of Science in Mathematics: Probability and Statistics.	24+18	

9. Total credit hours: (42.)

B. Mission, Goals, and Program Learning Outcomes

1. Program Mission:

Graduating students possessing thorough understanding of mathematical concepts, theories, research, and recent developments of mathematics by providing an integrated academic environment and research addressing the needs of the community and bolstering the economy of knowledge.

2. Program Goals:

The Program aims mainly at having students with the following traits:

- Possession of a profound background in the foundations of graduate-level mathematical analysis, abstract algebra, and applied mathematics.
- Development of critical thinking and ability to synthesize different mathematical concepts to obtain definite conclusions for mathematical problems.
- Obtainment of solid theoretical and practical knowledge in a particular field of study.
- Ability to conduct a research project and effectively communicate its findings to the research community.
- Practice of essential academic attributes, such as: self-learning, independence, responsibility, professional ethics, intuition, and pro-activity.

3. Program Learning Outcomes:*

Knowledge and Understanding:

K1	Outline advanced knowledge and understanding that covers theories, principles, and concepts in mathematics
K2	Write Critical awareness of techniques, practices, conventions and/or terminology relevant to mathematics.
K3	List Advanced knowledge and understanding of a range of established and specialized techniques of research and/or inquiry in mathematics.

Skills:

S1	Apply specialized theories, principles, and concepts to solve problems in complex and advanced contexts, in mathematics.
S2	Assess, objectively analyze, and focus on the key ideas, values, and theories; and offer innovative solutions to current issues and problems in diverse and advanced contexts in mathematics.
S3	Carry out advanced research using specialized techniques of research and inquiry in mathematics.
S4	Use quantitative and/or qualitative methods to process data and information in complex and advanced contexts, related to mathematics.
S5	Communicate in various forms to disseminate knowledge, skills, and research results related to mathematics.





S6	Identify, select, plan for (including resource planning), use and evaluate ICT applications and strategies to enhance the achievement of aims and desired outcomes.
Values, Autonomy, and Responsibility:	
V1	Work effectively, both independently and as part of an interdisciplinary group.
V2	Take full responsibility for initiating, identifying, amending, and achieving aims and desired outcomes, using new skills/ techniques as required.
V3	Able to articulate awareness of and demonstrate personal characteristics that positively impact the workplace and reflect integrity and professional and academic values when dealing with various issues.

* * Add a table for each track (if any)

C. Curriculum:

1. Curriculum Structure:

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	6	24	57.14
	Elective	4	12	28.57
Graduation Project (if any)	0	0	0	0
Thesis (if any)	Required	2	6	14.29
Field Experience(if any)	0	0	0	0
Others (.....)	0	0	0	0
Total		12	42	100

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

2. Program Courses:

Level	Course Code	Course Title	Required or Elective	Pre- Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	MATH6205	Mathematical Analysis	Required	-	4	Program
	MATH6605	Numerical Analysis	Required	-	4	Program
	MATH6407	Abstract Algebra	Required	-	4	Program
Level 2	MATH6409	Linear Algebra	Required	-	4	Program
	MATH6207	Measure Theory	Required	-	4	Program
	MATH6607	Differential Equations	Required	-	4	Program
Level 3	MATH6903	Research Project Part 1	Required	-	3	Program
	MATH6***	Elective course 1	Required	-	3	Program
	MATH6***	Elective course 2	Required	-	3	Program
	MATH6***	Elective course 3	Required	-	3	Program
Level 4	MATH6904	Research Project Part 2	Required	-	3	Program
	MATH6***	Elective course 4	Required	-	3	Program
Elective	Track 1: Algebra					
	MATH6411	Commutative Algebra	Elective	MATH6409	3	Program
	MATH6412	Number Theory	Elective	MATH6409	3	Program
	MATH6413	Special Topics in Algebra	Elective	MATH6409	3	Program
	MATH6414	Special Topics in Number Theory	Elective	MATH6409	3	Program
Track 2: Analysis						



Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)	
Elective	MATH6702	Topology	Elective	MATH6205	3	Program	
	MATH6703	Differential Geometry	Elective	MATH6205	3	Program	
	MATH6209	Complex Analysis	Elective	MATH6205	3	Program	
	MATH6210	Functional Analysis	Elective	MATH6205	3	Program	
	MATH6211	Theory of Partial Differential Equations	Elective	MATH6205	3	Program	
	MATH6212	Special Topics in Analysis	Elective	MATH6207	3	Program	
	MATH6213	Special Topics in Applied Analysis	Elective	MATH6207	3	Program	
	Track 3: Applied Mathematics						
	MATH6609	Introduction to Dynamical System	Elective	MATH6607	3	Program	
	MATH6610	Introduction to Graph Theory	Elective	-	3	Program	
	MATH6611	Mathematical Modelling	Elective	MATH6607	3	Program	
	MATH6612	Matrix Computation	Elective	MATH6605	3	Program	
	MATH6613	Numerical Solutions of Differential Equations	Elective	MATH6607	3	Program	
	MATH 6614	Nonlinear Optimization	Elective	MATH6605	3	Program	
Track 4: Statistics and Probability							
Elective	MATH6304	Probability Theory and Its Applications	Elective	MATH6207	3	Program	
	MATH6305	Method of Statistical Computation	Elective	-	3	Program	
	MATH6306	Multivariable Analysis	Elective	-	3	Program	
	MATH6307	Statistical Modelling and Inference	Elective	-	3	Program	
	MATH6308	Stochastic Modelling	Elective	-	3	Program	
	MATH6309	Applied Regression	Elective	-	3	Program	
	MATH6310	Special Topics in Probability and Statistics	Elective	-	3	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)

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											
	Knowledge and understanding			Skills						Values, Autonomy, and Responsibility		
	K1	K2	K3	S1	S2	S3	S4	S5	S6	V1	V2	V3
Algebra												
MATH6407	P	P	I	I	P	I	I	I	P	P	P	P
MATH6409	P	P	I	I	P	I	I	I	P	P	M	M



Course code & No.	Program Learning Outcomes											
	Knowledge and understanding			Skills						Values, Autonomy, and Responsibility		
	K1	K2	K3	S1	S2	S3	S4	S5	S6	V1	V2	V3
MATH6411	P	M	I	I	P	I	I	I	P	P	M	M
MATH6412	P	M	I	I	P	I	I	I	P	P	M	M
MATH6413	P	M	I	I	P	I	I	I	P	P	M	M
MATH6414	P	M	P	I	I	P	P	I	P	P	M	M
Analysis												
MATH6205	P	P	P	P	P	P	P	P	P	P	P	P
MATH6207	I	P	I	P	P	P	P	P	P	P	P	P
MATH6607	I	P	I	M	M	M	M	M	P	P	P	P
MATH6702	I	P	I	M	M	M	M	M	P	P	P	P
MATH6703	I	P	I	M	M	M	M	M	P	P	P	P
MATH6209	I	I	I	M	M	M	M	M	P	P	P	P
MATH6210	I	I	I	M	M	M	M	M	P	P	P	P
MATH6211	I	P	I	P	P	P	P	P	P	P	P	P
MATH6212	I	P	I	P	P	P	P	P	P	P	P	P
MATH6213	I	P	I	P	P	P	P	P	P	P	P	P
Applied Mathematics												
MATH6205	P	P	P	P	P	P	P	P	P	P	P	P
MATH6605	I	P	I	P	P	P	P	P	P	P	P	P
MATH6607	I	P	I	P	P	P	P	P	P	P	P	P
MATH6609	I	P	I	M	M	M	M	M	P	P	P	P
MATH6610	I	P	I	P	P	P	P	P	P	P	P	P
MATH6611	I	P	I	P	P	P	P	P	P	P	P	P
MATH6612	I	P	I	P	P	P	P	P	P	P	P	P
MATH6613	I	P	I	M	M	M	M	M	P	P	P	P
MATH6614	I	P	I	P	P	P	P	P	P	P	P	P
Probabilities and Statistics												
MATH6205	M	M	P	M	M	M	I	M	P	M	M	M
MATH6207	M	M	P	M	M	P	M	M	M	M	M	M
MATH6304	M	M	P	M	M	M	M	M	M	M	M	M
MATH6305	M	M	M	M	M	M	M	M	P	P	P	P
MATH6306	I	P	I	P	P	P	P	P	P	P	P	P
MATH6307	M	M	M	M	M	M	M	M	P	P	P	P
MATH6308	P	P	P	M	M	M	M	M	P	P	P	P
MATH6309	P	P	P	P	P	P	P	P	P	P	P	P
MATH6310	I	P	P	P	P	P	P	P	P	P	P	P

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

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

Describe teaching and learning strategies, to achieve the program learning outcomes in all areas.

Lectures, up-to-date textbooks, hand-outs, skills in using library and other learning resources, working groups, presentations, feedback, assignments, and structured experiences in groups.

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 once in the program's cycle).

Exams – Assignments – Discussions – Projects

D. Thesis and Its Requirements (if any):

1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

Not Applicable

2. Scientific Supervision:

(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/mechanisms of the scientific supervision and follow-up)

Not Applicable

3. Thesis Defense/Examination:

(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

Not Applicable

E. Student Admission and Support:

1. Student Admission Requirements:

The Department of Mathematics is committed to the **Unified Regulations of Postgraduate Studies at Saudi Universities** and its **Executive Regulations at King Khalid University**. And especially, **Article 15 for the entrance exam**, and **Article 18 for the complementary courses**.

Particularly, the department requires:

- A bachelor's degree in mathematics.
- Proficiency in English verified through one of the following:

Test	Required level
TOEFL-IBT	45
STEP	67
IELTS	4

- Passing tests and personal interviews conducted by the department.

If needed, all complementary courses that will be proposed must be passed with a grade of C or higher.



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).

- 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/laaha.pdf
- Electronical services guide
<https://bit.ly/3dodwuA>
- Ethical Framework
<https://www.kku.edu.sa/portfolio/5264>

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)

- 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 Student Affairs Committee in the Department, whose task is to provide broad oversight and policy guidance to promote a safe and supportive learning environment that encourages student academic success, growth, and personal development, and to review students' complaints and find appropriate solutions.





4. Special Support:

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

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

F. 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	--	5	Analysis Algebra Applied Mathematics Statistics and Probability	3	2	5
Associate Professor	--	8		5	3	8
Assistant Professor	--	4		2	2	4
Technicians and Laboratory Assistants	--	--	2 ITs	1	1	2
Administrative and Supportive Staff	--	--	3	1	2	3
Others (specify)	--	--	--			

G. 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.)

- 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, classrooms, etc.)





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

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

(According to the nature of the program)

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

H. Program Quality Assurance:

1. Program Quality Assurance System:

Provide a 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:

The Department of Mathematics is committed to the King Khalid University Quality Standards <https://quality.kku.edu.sa/ar/publications>

3. Procedures to Monitor Quality of Courses Taught by other Departments:

Not Applicable

4. Procedures Used to Ensure Consistency within the main campus: (including male and female sections).

Not Applicable

5. Assessment Plan for Program Learning Outcomes (PLOs):

The MSc committee will collect feedback from:

- Results of academic achievement.
- Cases of excellence.
- Extracurricular activities.
- Periodic interviews with students.
- 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 Graduate Studies.
- Review of suggestions from employers to address deficiencies in graduates.





The MSc 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.

6. 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.

Evaluation Areas/Aspects (e.g., leadership, the 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.)





7. Program KPIs:*

The period to achieve the target (2) year(s).

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-PG-1	Students' Evaluation of Quality of learning experience in the Program	4.5	Survey of last year student's opinions.	At the end of each academic year.
2	KPI-PG-2	Students' evaluation of the quality of the courses	4.5	Survey of student's opinions	At the end of each semester.
3	KPI-PG-3	Students' evaluation of the quality of academic supervision	4.5	Survey of student's opinions.	At the end of each 1st year of a batch.
4	KPI-PG-4	Average time for students' graduation	2	Data Analysis from eRegister.	End of each semester.
5	KPI-PG-5	Rate of students dropping out of the program	0	Data Analysis from eRegister.	Yearly
6	KPI-PG-6	Employers' evaluation of the program graduates' competency	100%	Survey Employers' opinions.	Yearly
7	KPI-PG-7	Students' satisfaction with services provided	4.5	Survey of student's opinions.	At the end of each semester.
8	KPI-PG-8	Ratio of students to faculty members	2.1	Data Analysis from eRegister	At the end of each semester.
9	KPI-PG-9	Percentage of publications of faculty members	95%	Ratio of teaching staff publishing 1 paper to the other teaching staff.	Yearly
10	KPI-PG-10	Rate of published research per faculty member	2	Average number of publications.	Yearly
11	KPI-PG-11	Citations rate in refereed journals per faculty member	30	Average number of citations per published paper.	Yearly
12	KPI-PG-12	Percentage of students' publication	100%	Average number of publications.	Graduation
13	KPI-PG-13	Number of patents, innovative products, and awards of excellence	5	Numeric comparison	Yearly

*including KPIs required by NCAAA





I. Specification Approval Data:

Council / Committee	Department Council
Reference No.	23/44
Date	09/01/1445

Council / Committee	College Council
Reference No.	25/44
Date	16/01/1445

