2023
TPG-151

Program Specification
(Postgraduate)

Program:	**Master in Pure Mathematics**
Program Code (as per Saudi university ranking):	**7**
Qualification Level:	**Master degree in Science**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Taif University**
Program Specification:	New ☐ updated* ☒
Last Review Date:	4/4/1445 H

***Attach the previous version of the Program Specification.**

Table of Contents :

A. Program Identification and General Information:

1. Program's Main Location:

Main Campus (Male and Female)
Taif University, Al-hawiah- Taif.

2. Branches Offering the Program (if any):

1- **Khurmah Branch**
2- **Turba Branch**
3- **Rania Branch**

3. System of Study:

☒ **Coursework & Thesis** ☐ **Coursework**

4. Mode of Study:

☒ **On Campus** ☐ **Distance Education** ☐ **Other ……(specify)**

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

- **Partnership Arrangement:**
- **Type of Partnership:**
- **Duration of Partnership:**

6. Professions/jobs for which students are qualified:

1- **Postgraduate studies.**
2- **Lecturer at the university level.**
3- **Teacher for the pre-university levels at the ministry of education.**
4- **Researcher at Pure Mathematical research centers.**
5- **Financial institutions.**

7. Relevant occupational/ Professional sectors:

8. Major Tracks/Pathways (if any):		
Major track/pathway	**Credit hours** (For each track)	**Professions/jobs** (For each track)
One track		
9. Total credit hours: (37)		

B. Mission, Goals, and Program Learning Outcomes

1. Program Mission:

- **Provide quality education and lifelong learning.**
- **Encourage innovation and scientific research.**
- **Strengthen community engagement and prepare qualified and competent people within a motivating environment that is up to date with modern technology.**

Offer excellent knowledge aimed at graduating students in the field of mathematics and its applications capable of meeting the development's needs of the Kingdom and its community, as well as enriching knowledge through education, research, authoring original books, translating to Arabic well - reputed books, and optimal use of technology.

2. Program Goals:

- **Meet the requirements of higher education institutions for highly qualified M.Sc. holders in pure mathematics.**
- **Attract mathematically talented and prepare them for research and teaching.**
- **Providing distinguished researchers in pure mathematics.**
- **Enhancing the research activity of the department.**
- **Producing original theses.**
- **Producing distinguished national cadres of specialists in mathematics to contribute efficiently and effectively to the scientific and technical renaissance in the country.**
- **Training the enrolled in logical thinking**

Providing with extensive and in-depth knowledge in one of branches of pure mathematics.

3. Program Learning Outcomes:*

Knowledge and Understanding:	
K1	**Describe fundamental facts, concepts, principles, procedures, and theories in mathematics**
K2	**Demonstrate appropriate techniques and skills in mathematics.**
Skills:	
S1	**Solve practical problems in a range of areas of mathematics**
S2	**Determine the appropriateness of different methods of solving mathematical problems.**
S3	**Design, undertake, analyze and report a scientific study.**
S4	**Apply conceptual understanding of concepts, principles, procedures, and theories**
Values, Autonomy, and Responsibility:	
V1	**Work effectively and constructively in group or team situations, whether in a leadership role or as a member of a group.**
V2	**Express understanding or conclusion by writing an essay or a thesis.**
V3	**Communicate effectively, lucidly, and accurately in both oral and writing.**

* * 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	18	49%
	Elective	3	9	24 %
Graduation Project (if any)		NA	NA	NA
Thesis (if any)		1	10	27 %
Field Experience(if any)		NA	NA	NA
Others (.....)		NA	NA	NA
Total		10	37	100%

* Add a separated 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	202504-3	Theory of Differential Equations	Required	None	3	Program
	202617-3	Differential Geometry	Required	None	3	Program
	202508-3	Abstract Algebra	Required	None	3	Program
Level 2	202510-3	Algebraic Topology	Required	None	3	Program
	202581-3	Functional Analysis (1)	Required	None	3	Program
	202582-3	Rings theory	Required	Abstract Algebra	3	Program
Level 3		Elective course 1	Elective	None	3	Program
		Elective course 2	Elective	None	3	Program
		Elective course 3	Elective	None	3	Program
Level 4	202699-10	Thesis	Required	None	10	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)

https://drive.google.com/drive/folders/1MUs-7Y42tKXrGSxD4rfAf5OS1htG5Cpy?usp=sharing

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	---	V1	V2	----
Course Theory of Differential Equations	x	x	x		x	x	x		x	x	
Course Differential Geometry	x	x	x		x	x	x		x	x	
Course Algebraic Topology	x	x	x		x	x	x		x	x	
Course Abstract Algebra	x	x	x		x	x	x		x	x	
Course Functional Analysis (1)	x	x	x		x	x	x		x	x	
Course Rings theory	x	x	x		x	x	x		x	x	
Course Complex variables	x	x	x		x	x	x		x	x	
Course Elective (1)	x	x	x		x	x	x		x	x	
Course Elective (2)	x	x	x		x	x	x		x	x	
Course Elective (3)	x	x	x		x	x	x		x	x	
Course Thesis											

* 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, to achieve the program learning outcomes in all areas.

	NQF Learning Domains and Learning Outcomes	Teaching Strategies
Knowledge and Understanding		
K.1	Describe fundamental facts, concepts, principles, procedures, and theories in mathematics.	• Lectures Class discussion
K.2	Demonstrate appropriate techniques and skills in mathematics.	
Skills		
S.1	Solve practical problems in a range of areas of mathematics.	1. Lectures 2. Reading and reflecting students' homework. 3. Discussing the common and fatal mistakes reported in the homework, quizzes and exams. 4. Solving problems in the class. 5. Group discussion 6. Projects
S.2	Determine the appropriateness of different methods of solving mathematical problems.	
S.3	Design, undertake, analyze and report a scientific study.	
S.4	Apply conceptual understanding of concepts, principles, procedures, and theories.	
Values		
V.1	Work effectively and constructively in group or team situations, whether in a leadership role or as a member of a group.	Lectures Team work Group Discussion Hands on exercises Reading some topics related to the course contents
V.2	Express understanding or conclusion by writing an essay or a thesis.	
V3	Communicate effectively, lucidly, and accurately in both oral and writing.	

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).

- **Written (Midterm and Final exams).**
- **Quizzes.**
- **General report.**
- **Homework.**
- **Project.**
- **Oral presentation of the projects. Computers software program.**

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)

- The admission requirements are established in accordance with the criteria set by the college council and the admission requirements of Taif University.
- To be eligible for admission, the applicant must pass successfully sixteen credit hours of courses with a GPA with a minimum average 3.75 out of 5.

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)

- The department assigns supervisors for the thesis.
- The student should prepare a thesis under supervision. This work requires the following main steps:

✓ Choose the subject of the project.
✓ Prepare a literature survey about the (project) topic.
✓ Recognize the importance of library and internet in expansion of our knowledge.
✓ Develop a research plan.
✓ Investigate the area of interest.
✓ Apply appropriate software and web resources.
✓ Write up the thesis and defend it.

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)

The thesis should be discussed and reviewed by internal and external reviewers.

E. Student Admission and Support:

1. Student Admission Requirements:

The admission requirements for the program will be in accordance with those of KFU and in agreement with the criteria set by the College Council.
In summary, to be eligible for admission, the applicant must:

1- Fulfill the admission requirements specified in the unified regulations for graduate studies in universities.
2- Have B.Sc. degree in mathematics from a Saudi university or from a recognized university
3- Obtain the score specified by the College Board in an English language test.

Pass an admission test provided by the department in accordance with Article 16 of the Unified Regulations for Postgraduate Studies in Saudi universities.

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).

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)

The program will apply the QMS policies and procedures (QMS E.2 and E.3) regarding the academic activities, guidance.

4. Special Support:

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

Low achievers, gifted, and talented students:
The program uses, as a part of student counseling and advising system, an available electronic service that allows for tracking students with special learning difficulties through monitoring their academic records and allows for intervention through counseling to help them overcome their weaknesses. Moreover, the program has a committee for fostering the gifted and talented students. This service is linked to the banner system.

Students with disabilities:
Buildings of college of science are highly accessible for individuals with special needs. This includes wheelchair ramp, elevators and disabled toilets facilities

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
Professors	Math & Statistics	Pure Math	sufficient experience, skills and possesses extensive relations in their specialization area	6	2	8
Associate Professors	Math & Statistics	Pure Math		6	0	6
Assistant Professors	Math & Statistics	Pure Math		0	0	0
Technicians and Laboratory Assistants				1	1	2
Administrative and Supportive Staff	Secretary		Administrative &Computer skills	1	1	2
Others (specify)	NA					

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.)

- **The Learning Resource Committee (LRC) of the college facilitates and guides the use of available learning resources. The committee also supports and assists the faculty in the provision and use of such resources inside and outside the classroom to enhance program delivery. The LRC meets with faculty to identify the learning resources' requirements such as books, soft wares, or other resources and plan for their procurement. The committee also submits the demand for books and journals to the Library Deanship as per faculty need.**
- **The Course Report (CR) contains a section on resources and facilities where difficulties in accessing, adequacy and evaluation are stated.**
- **The Course Evaluation Survey (CES) is conducted by students at the end of each semester.**
- **The Learning Resource Committee submits to the college council who approves the list of textbooks for endorsement to the Deanship of Library for the acquisition.**

The University provides:

- **Library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from library staff to enable you to make the best use of these resources.**
- **High-speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the KFU wireless network. There is a wide range of application software available from the Student Public Workstations.**

- **Computer accounts, which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources).**
- **Standard ICT tools such as Email, secure file store and calendars.**

Assessment and support (including specialist IT support) facilities if you have a disability, long-term health problem or specific learning difficulty.

2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

Policies and Procedure for providing and quality assurance of Facilities and Equipment (Library, laboratories, medical facilities, classrooms, etc.).

1. **All the faculty members are asked through heads of their departments to submit the learning resource requirements (books, software's, lab equipment/instrument) required for optimum course delivery, as well as for their research.**
2. **The Learning Resource Committee collects all pertinent requirements, while the committee for research and labs deals with lab equipment/reagents.**
3. **The specifications are discussed and approved by the committee and are recommended to the college council.**
4. **Demands for required text and reference books for courses are forwarded to the Deanship of library affairs for purchase and provision in the library.**
5. **The laboratory and classroom resources are forwarded to the purchasing department of the university.**
6. **Other support that includes health services.**
7. **The department has the following infrastructures to facilitate teaching and research activities:**

- **Two computer laboratories.**
- **A self-learning room.**
- **At least one video conference room.**
- **A library for faculty members.**

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

(According to the nature of the program)

All used classrooms are appropriate and safe.

H. Program Quality Assurance:

1. Program Quality Assurance System:

Provide a link to quality assurance manual.

2. Program Quality Monitoring Procedures:

1. **The Academic Programs Committee:**
   Implement the periodic procedures to ensure the quality of the academic program, by collecting the information about the program using various assessment tools and analyzing these results annually to identify the strengths and weaknesses to improve performance, according to the following:
   - **Analyze the results of direct measurement of the CLOs and PLOs and prepare their reports.**
   - **Analyze surveys results and prepare a report about its results.**
   - **Prepare the program's annual report.**
   - **Align PLOs with program graduate attributes and prepare the required reports.**

- Study the latest surrounding conditions of the program and the developments of the labor market and the extent of demand for program graduates.
- Prepare a comprehensive annual report including strengths and shortcomings points and declare the proposals for improvement and development of the program.

2. Department Council:
   Raise the reports of the academic programs committee in the department to the council of the department in accordance with their powers and the council take appropriate recommendations and approve the periodic reviewing reports and raise them to the Dean of the College.
3. Dean of the College:
   Submit the periodic reviewing reports of the program from the Dean of the College to the Development and Accreditation Committee of the College to review reports and study recommendations as well as take actions to implement and raise that recommendations and reports to the College's Council for approval.
4. College Council:
   Approve the program's reports and raise them to the University Deanship of Development.
5. University Deanship of Development:
   - Follow-up the programs' periodic reviews with the concerned departments and provide the Academic Programs Committee with the required academic support.
   - Review reports and recommendations related to academic programs submitted from the development and accreditation committees coordinators of college.
   - Based on the submitted reports, a report must be raised to the University's Agency on the need to modify, develop or cancel the program a report to the University Agency on the need for the program to modify, develop or cancel in report light raised.
6. The University Agency for Academic Affairs and Development:
   Submit recommendations to the University Council.
7. University Council:

Raise a report on those academic programs which need to modify, developed or cancel to the University Council for appropriate decisions.

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

To be sure that the courses provides by other departments meet the needs of students in the mathematics Program, the following procedures have been done:

- Communication with other departments to ensure that the required course coverage fulfills the needs of mathematics students.
- The syllabus of the courses offered by other programs must be reviewed by the undergraduate committee of the department to ensure compliance with the program's needs.
- The department must approve the syllabus of the courses offered by the other departments.
- Courses evaluation by all stakeholders

4. Procedures Used to Ensure the Consistency between within the main campus:

(including male and female sections).

The department quality assurance committee includes one staff member from all branches as a coordinator for each branch.

- Each coordinator must write a report about his branch at the end of every semester as well as an annual report.
- Follow-up the programs' periodic reviews with the concerned branches' coordinators and provide

them with the required academic support.
• Review reports and recommendations related to the program which are submitted from branches' coordinators.

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

A committee was formatted to set and evaluate the learning outcomes of the general mathematics program.
• Use the National Qualifications Framework for Higher Education in the Kingdom of Saudi Arabia as the main source of information required.
• Study the learning outcomes of similar programs in different universities inside or outside Saudi Arabia.
• Taking the opinion of the advisory committee about the learning outcomes of the program.
• Taking the employers' opinion about the learning outcomes of the program.
• Align PLOs with program graduate attributes and prepare the required reports.
• Study the latest surrounding conditions of the program and the developments of the labor market and the extent of demand for program graduates.
• Set the mapping matrix of program learning outcomes with courses.
• Design a plan to generate and collect data.
• Analyze data.
• Prepare a comprehensive annual report including strengths and shortcomings points and declare the proposals for improvement and development of the program.

6. Program Evaluation Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Leadership	Staff members Students	Surveys	End of the academic year
Effectiveness of teaching	Students	Surveys Exams' results	During semesters
Effectiveness of assessment	Staff members	Inspection of exams according to CLOs	End of semesters
Learning resources	Students Staff members	Surveys	End of semesters
Program KPIs	Program leaders	Results of KPIs	End of the 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.)

7. Program KPIs:*

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

No	KPIs Code	KPIs	Target	Measurement Methods
1. Mission and Goals	KPI-P-01	Percentage of achieved target level of KPIs of program operational plan	75% are achieved	Percentage of performance indicators that achieved the target level in the operational plan annually to the total number of targeted indicators per year
2. Program Management and Quality Assurance	KPI-P-02	The satisfaction of beneficiaries with the quality of community services	75% are satisfied	The rate of satisfaction of beneficiaries with the quality of community services provided by the program on a five-level scale in an annual survey
3. Teaching and Learning	KPI-P-03	Students' Evaluation of quality of learning in program	75% are satisfied	Average rating of the overall quality of students' learning experiences on a five point scale in an annual survey of final year students
	KPI-P-04	Students' evaluation of the quality of their courses	75%	Average rating of the overall students evaluation of courses on a five point scale in an annual survey
	KPI-P-05	Completion Rate	75%	Proportion of students entering undergraduate programs who complete the program in minimum time (i.e., in the set period)
	KPI-P-06	First-Year Students Retention Rate	80%	Percentage of first-year undergraduate students who continue at the program the next year to the total number of first-year students
	KPI-P-07	Students' performance in the professional and/or national examinations (if any)	75%	
	KPI-P-08	Proportion of graduates who employed or enrolled in further study	50%	Proportion of graduates from the program who within a year of graduation are: a. employed b. enrolled in further study
	KPI-P-09	Average Number of students in the class	30%	Average Number of students in each teaching sessions (lecture, small group, tutorial, laboratory and clinical sessions)
4. Students	KPI-P-10	Employers' evaluation of the program graduates proficiency	70%	The average rating of employers for the proficiency of the program's graduates on a scale of five levels in an annual survey
	KPI-P-11	Student satisfaction with the services	80% are	Student satisfaction rate for the various services offered by the program (restaurants, transport, sports facilities,

No	KPIs Code	KPIs	Target	Measurement Methods
			satisfied	academic guidance ...) on a five-level scale in an annual survey of students
5. Teaching Staff	KPI-P-12	Ratio of students to teaching staff	25 students per 1 teacher	Total number of full-time and full time equivalent teaching staff to the total number of students in the program
	KPI-P-13	Percentage of teaching staff distribution		Percentage of teaching staff distribution based on: a. Gender b. Branches c. Academic Ranking
	KPI-P-14	Proportion of teaching staff leaving the program	1.5%	Proportion of teaching staff leaving the program annually for reasons other than age retirement to the total number of teaching staff.
	KPI-P-15	Percentage of publication of faculty members	80%	Number of full-time faculty members who published at least one research during the year to total faculty members
	KPI-P-16	Average research per faculty member	1 per year	The average number of refereed or published researches per each faculty member during the year.
	KPI-P-17	Average of citations in refereed journals	30%	Number of citations in refereed journals per total number of publication.
6. Learning Resources, Facilities, and Equipment	KPI-P-18	Satisfaction of beneficiaries with learning resources	75%	Satisfaction rate of beneficiaries on the adequacy and diversity of learning resources (references, journals, databases… etc) on a scale of five levels in an annual survey.

*including KPIs required by NCAAA

I. Specification Approval Data:

Council / Committee	Department of Mathematics and Statistics
Reference No.	-
Date	7/4/1445 H

قسم الرياضيات والإحصاء
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