KHUSHAL KHAN KHATTAK UNIVERSITY, KARAK

SELF ASSESSMENT REPORT

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DEPARTMENT OF MATHEMATICS

Fall-2024

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Introduction

Khushal Khan Khattak University Karak was established in 2012. The University has been a dream of the populace, realized in the form of this University, named after the legendary Khushal Khan Khattak. The University provisionally started functioning in the old building, previously occupied by the revenue academy. The main campus of the University is under construction near Jail Chowk Karak which and one Academic Block is completed in 2024. At present eighteen departments have been started in the campus namely, Department of Education and Research, Management Sciences, Computer Sciences, Bioinformatics, Communication and Media Studies, Library and Information Sciences, English, Geology, Psychology, Chemistry, Botany, Zoology, Mathematics, Renewable Energy, MLT, Artificial Intelligence Economics and Physics.

University Vision Statement

Competitive and conducive environment for research, discovery and learning.

University Mission Statement

To make university a place emanating knowledge, exhibiting liberty of thought and coveted seat of learning, to infuse spirit of excellence, creativity, innovation and scholarship into the life of the university. To offer competitive and nationally recognized, opportunities for research, discovery, learning and engagement to a diverse population of students in a conducive environment.

Department of Mathematics

Department of Mathematics, Khushal Khan Khattak University Karak was established in September, 2019, under the chairmanship of Dr. Saeed Ullah Jan. Currently the department offers:

Bachelor of Studies in Mathematics (BS Mathematics 4-Year Program)

Program Selected

The Department of Mathematics has selected the program of BS Mathematics for Self-Assessment Report (SAR) for the year 2023-24 under the directives of Higher Education Commission (HEC).

Program Evaluation

The program is being evaluated based on eight (8) criteria and thirty-one (31) standards as given in the Self-Assessment Manual provided by HEC.

EXECUTIVE SUMMARY

The Department of Mathematics, Khushal Khan Khattak University, Karak was established in September, 2019, under the chairmanship of Dr. Saeed Ullah Jan. The Department of Mathematics conducts research on each and every aspect of mathematics, like pure mathematics, applied mathematics, decision support systems, artificial intelligence, Computational mathematics. The department offers only BS program in Mathematic with fresh admissions advertised every September (Fall). Currently enrolled students count is 10, 6, 11 and 8 in 2^{nd}, 4^{th}, 6^{th} and 8^{th} Semesters respectively.

It should be a matter of satisfaction to all the concerned that the Department has been successful in the pursuit of the aims and objectives for which it was established. The curriculum is designed by the faculty members of the department. The curriculum and course contents of the degree were then shared with Mathematics experts working in different universities and colleges. A few suggestions were put by experts, and the curriculum was designed accordingly. Departmental Board of Studies comprises of Head of the Department as convener and two senior faculty members from other departments. The Department of Mathematics is in the phase of development. The faculty members are perusing some research topics related to their academic growth.

Curriculum design updating is based upon approved criteria. The university Examinations and academic are annually scheduled in the form of academic calendar. The basic facilities are not available for students and faculty such as classrooms and faculty office. Student's affair Incharge has taken very active actions related to extra curriculum activities like sports, speech competition etc. There are some minor short comings and limitation which are hopefully in line for upcoming projects.

The mathematics department of the university can be advanced if the following suggestions are fulfilled.

- The Department of Mathematics needs permanent Faculty as there is no permanent teacher in the department.
- The latest mathematical software such as MATLAB, MATHEMATICA, LATEX, MAPPLE, SWP should be acquired with academic license in order to get students trained for the future prospects in academic activities and other private firms.

Criterion-1

Program Mission, Objectives and Outcomes

Standard 1.1

The program must have documented measurable objectives that support Faculty / College and institution mission statements:

Department Vision

To act as a leader in the advancement of Mathematics and promotion of science and technology in Khyber Pakhtunkhwa in particular and in the country in general.

Department Mission

The Department of Mathematics' mission is to provide an environment where students can learn and become competent users of Mathematics. Moreover, the Department will contribute to the development of students as Mathematical thinkers, enabling them to become lifelong learners, to continue, to grow in their chosen professions and to function as productive citizens.

Department Objective

- To engage in goal-oriented higher-level teaching and research.
- To promote cooperation and inter-disciplinary relationships with other teaching and research organizations of the country and abroad.
- To arrange conferences, seminars and refresher courses for the promotion of Mathematics, education and research. To provide a platform to the student so that to exploit their academic potentials and teaching skills.

Strategic Plan for Achieving Program Objectives:

1. Curriculum design and strengthening of faculty.
2. Use of ICTs and other modern techniques in delivering the lectures and knowledge.
3. Online lectures and literature review facilities.
4. Organizing seminars, workshops and other activities.
5. Study tours and visits of prominent Mathematics institutes.

Program Objectives:

1. Foundation:

To provide students with concrete foundation in Mathematics knowledge with respect to their needs upon entering the profession.
A number of elements and goals are set up to achieve the above objective:

Goal-1: To Identify elements and strategies for graduate program of the Department

Elements:

a. Current HEC and Statutory bodies approved curriculum of Mathematics for Graduate program with national standards.
b. Linkage between theory and practice.
c. Orientation of manual and computerized practical assignments.
d. Motivation of teachers and students.
e. Seeking inputs from employers.

Strategy: Analytical and critical review of graduate program in terms of academic and research activities with new strategy for continuous improvement in Mathematics education.

Goal-2: To provide quality education and scholarly research

Elements:

a. Promotion of individual and cooperative research activities.
b. Efforts of research towards national and international standards and challenges.

Strategy: Close liaison with all the stake holders for critical and analytical review of the program.

Goal-3: To establish cooperative measures and partnership with sister institutes and information settings.

Elements:

a. To adjust our students for internship in university.
b. Enhance relations with renowned departments and institutions settings for trainings, and workshops.
c. Seek internship for the students.

Strategy: Develop viable mechanism for continuous improvement of the program.

2. Skills and Tools:

To provide students with the skills to work in Mathematics. Actually, these competencies are the further specific objectives of the program:

a) To create awareness of information and communication technologies used in students. (How Mathematics could aware you, either through lectures or through online activities)
b) To develop skills among students for the acquisition, organization, and dissemination of information and knowledge.
c) To develop an understanding among students about the properties of literature in the fields of Humanities, Social Sciences, Pure Sciences, Applied Science, Pakistan and Islam etc.

d) To inculcate skills among students about the methods of research and to promote problem-oriented research in the field of Mathematics or related topics.
e) To develop an understanding among students to use information technology efficiently in information storage, data processing and retrieval services of Mathematics center.
f) To develop competence among students for the automated management centers of Mathematics in Pakistan.
g) To develop skills for the production of media and material in the field of Mathematics.
h) To prepare students for planning and designing the software products, codes for their own mathematical model and to serve the users' national benefits.
i) To develop competence among students for the marketing mathematics technologies in Pakistan.
j) To make the students aware of the future needs of centers of Mathematics.

Professional Practices and Ethics:

To provide students with the knowledge relevant to mathematical practices including its ethical, professional, social and global impact on society.

Alignment of Objectives with Program:

"All the above objectives are aligned with vision and mission statements of the program in terms of competencies, needs of society as well as ethical and professional practices to work with the spirit of providing quality education".

Table-1: Program objectives assessment

S. #	Objectives	How measured	When measured	Improvement identified	Improvement made
A	B	C	D	E	F
1	Foundation	a) Survey of Graduating students. b) Faculty survey.	*The program was measured in previous semester and implemented some measures.* Feb-2022. (Current Surveys)	• *The department needs the following:* • Collection development in departmental library. • Provision of high speed internet connectivity, library visits. • Computer lab. • Arrangement of seminars, conferences and symposiums. • Student internship activities throughout the year in university central & departmental libraries	1. Implemented new curriculum of HEC. 2. Provided the facility of Internet connectivity. 4. Access to HEC National Digital Library Program 5. Partially acquired few reading material. 6. Workshop was arranged.
2	Skills and tools:	a. Alumni Survey. b. Employer Survey. Note: As the department is newly established, therefore no alumni exist. The same is for employer survey as we have no product in the market so far.	**N/A**	N/A	N/A
3	Professional Practices and Ethics:	a. Alumni Survey. b. Employer	**N/A**	N/A	N/A

		Survey. Note: As per para above			

Note*: The survey reports of Faculty and Teachers Evaluation are attached in the Annexure II and III respectively*

Standard 1.2

The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes:

Program Outcomes

Following are the program outcomes that will enable the graduates of Mathematics to:

1. Demonstrate the ability to apply knowledge of Mathematics in the field with respect to print and non-print formats of information resources.
2. Assess collection development policy and bibliographical control.
3. Apply Mathematics classification system for organizing information.
4. Apply mathematical techniques in order to solve real work problems.
5. Locate, retrieve, evaluate and disseminate information and information sources and reference services.
6. Apply principles of Mathematics and demonstrate leadership abilities.
7. Apply relevant research method to problem solving.
8. Analyze tools and practices of Information Technology, Artificial Intelligence.
9. Apply MATLAB and other software for the analysis and graphical representation of the problem.
10. Demonstrate and develop mathematical tools and Networking.
11. Understand information sources and information cycle of disciplines of Natural Sciences.
12. Analyze the characteristics of Mathematics and their application to real life problems.
13. Communicate effective communication and interpersonal skills.

The program outcomes are the byproduct of the program objectives. In this connection, the following table shows interrelationship between program's objectives and outcomes:

Table-2: Relationship between program objectives and program outcomes

Program Objectives	Program outcomes												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	□
2a	⊙	●	⊙	⊙	⊙	⊙	⊙	□	□	⊙	□	□	□
2b	●	⊙	□	●	⊙	⊙	⊙	⊙	⊙	⊙	□	□	⊙
2c	●	⊙	□	●	⊙	□	□	⊙	⊙	⊙	⊙	□	●
2d	⊙	⊙	□	□	⊙	⊙	□	⊙	⊙	□	□	□	⊙
2e	⊙	⊙	⊙	⊙	⊙	⊙	□	⊙	⊙	⊙	●	□	□
2f	●	□	□	□	●	⊙	⊙	⊙	□	□	●	●	⊙
2g	⊙	□	⊙	⊙	□	□	□	●	●	□	□	□	●
2h	⊙	●	□	□	⊙	●	●	●	●	●	□	□	□
2i	⊙	●	●	●	●	⊙	⊙	⊙	□	□	□	●	●
2j	⊙	⊙	□	□	□	●	□	⊙	□	⊙	⊙	□	□
3	⊙	□	□	□	□	□	⊙	□	□	⊙	□	□	□

Legend:

- □ Denotes substantial contribution to the objectives.
- ⊙ Denotes moderate contribution to the objectives.
- ● Denotes no contribution to the objectives.

The above table need to be easier not understandable

Standard 1.3

The results of program's assessment and the extent to which they are used to improve the program must be documented:

The program's assessment was carried out in Feb 2019 by using the 2 questionnaires/forms such as Student Course Evaluation and Students Feedback on Teaching. Some possible measures were taken in connection to findings of the assessment to improve the program:

a) Actions Taken:
   - i) Started 4 years BS Mathematics Program (BS Mathematics).
   - ii) Implemented the new and revised curriculum of HEC.
   - iii) Some text books both in hard and soft form were acquired.
   - iv) A number of faculty meetings were held for discussion and peer review relating to improving the program.

b) Future Program improvements plans:
   - i) Readdressing the Curricula of Mathematics by incorporating emerging techniques of Mathematics management studies.
   - ii) Extension of Computer Lab.

iii) Improving Quality Education.
iv) Improving Team work efforts.
v) Achieving the objectives of quality education in terms of needed competencies.
vi) Providing and availing the facilities of Continuing Education.
vii) Capacity building of faculty through faculty development program.
viii) Internship is must for students

c) Weaknesses of the Program:

i) Separate Lab for subject Practical.
ii) Limited Information resources
iii) Scarcity of reading materials and latest practical tools.
iv) IT training and sustainable development.
v) Limited access to HEC Digital Library.

d) Future Development Plans:

i) Seeking collaboration with domestic and foreign agencies and organization for receiving help through exchanging the views, trainings, donations and boasting the research activities.
ii) Seeking collaboration of different organization for internship of the students.
iii) M.Phil and Ph.D Programs will be start soon.
iv) Establishing Practical Lab for convenient conduct of subject practical.
v) Understanding and Implementation of MATLAB software.
vi) Acquiring the latest editions of reading materials and practical tool.
vii) Planning and developing collaborative measures with sister departments for strengthening the department.

Standard 1.4

The department must assess its overall performance periodically using quantifiable measure:

a) Students Enrollment: See the table below:

Table 3: Students enrollment for the last two years

S. No.	Year	Bs Mathematics	Total
1	2021	10	10
2	2022	14	24
3	2023	6	30
4	2024	10	50

b) Faculty/ Student ratio 1:12
c) Time for completing BS Mathematics degree: 4 Years
d) Average grade point (or) 2nd Division
e) Employer's satisfaction: See Table 4 below:

Note*: Employer satisfaction level can be judged from the outcomes of the Department. As at this stage, the Department has not given any product to the market. That is there is no need of employer survey at this stage.*

Table 4*: Frequency and percentage distribution of the respondents (Faculty) regarding their satisfaction level and the effectiveness of programs to help them progress and excel in their profession.*

Q. #	Question Items	Very Satisfied		Satisfied		Neutral		Dissatisfied		Very Dissatisfied	
		f	%	f	%	f	%	f	%	f	%
1	Your mix of research, teaching and community service	0	0	5	100	0	0	0	0	0	0
2	The intellectual stimulation of your work	2	40	3	60	0	0	0	0	0	0
3	Type of teaching/ research you currently do	2	40	3	60	0	0	0	0	0	0
4	Your interaction with students	5	100	0	0	0	0	0	0	0	0
5	Cooperation you receive from colleagues	1	20	4	80	0	0	0	0	0	0
6	The mentoring available to you	0	0	3	60	2	40	0	0	0	0
7	Administrative support from the department	0	0	5	100	0	0	0	0	0	0
8	Providing clarity about the faculty promotion process	0	0	0	0	5	100	0	0	0	0
9	Your prospects for advancement and progress through ranks	0	0	0	0	5	100	0	0	0	0
10	Salary and compensation package	0	0	5	100	0	0	0	0	0	0
11	Job security and stability at the department	3	60	2	40	0	0	0	0	0	0
12	Amount of time you have for yourself and family	0	0	0	0	1	20	4	80	0	0
13	The overall climate the department	5	100	0	0	0	0	0	0	0	0
14	Whether the Department is utilizing your experience and knowledge	5	100	0	0	0	0	0	0	0	0
14	What are the best programs /factors currently available in your department that enhance your motivation and job satisfaction	New curricula, availability of computer lab facility along with internet connectivity and existing salary package are the factors of enhancing motivation and job satisfaction of the faculty.									
15	Suggest programs/factors that could improve your motivation and job satisfaction	Updating computer lab facilities, acquiring latest editions of reading material, providing IT training, conducting workshop / Seminars and availing the opportunity of pursuing further study are factors of improving motivation and job satisfaction of the faculty.									
16	Information about faculty member	Majority of faculty members are holding the post of Lecturers with 2-07 years experience.									

The above table reveals that faculty members seem satisfied with relation to program effectiveness in order to progress and excel in the profession except the availability of mentoring for them. But they seem unsatisfied with the time they get for their family and themselves.

Criterion-2

Curriculum Design and Organization

CRITERION-2: CURRICULUM DESIGN AND ORGANIZATION

Standard 2.1

The Curriculum must be consistent and supports the programs documented objectives

The curriculum designed for BS Mathematics is based on certain objectives and learning outcomes. The curriculum is a blend of theory and practical covering the needs of all types of subjects. The curriculum of the program is attached in the **Annexure V.**

The department of Mathematics is running its academic program through semester system of examination.

Under Graduate Education Policy: Effective from Fall-2023

S. No	Domain	Minimum requirements	MATH Workload Credit Hours
1	General Education	30	34
2	Allied Courses	12	12
3	Major	72	84
4	Internship/Field Study	03	03
5	Research Project	03	03
6	Teaching of the Holy Quran	Non-Credit (03)	
	Total Credit Hours		**134**

a) **Title of Degree Program**: BS Mathematics

- Total numbers of credit hours 134
- Duration 4 years (8 Semesters)
- Semester duration 16-18 weeks
- Semesters 8
- Course load per semester 15-18 Credit hours
- Number of courses per semester 4-6

Eligibility Criteria

- FA with Mathematics/F. Sc Pre-Engineering/DAE or Equivalent with Mathematics having at least 45% Marks.

- Associate Degree in Science with a minimum CGPA of 2.00 out 4.00 or equivalent.

Provided that the candidates, if admitted shall be placed in 5th Semester of BS Mathematics.

Provided further that they shall be offered bridging courses of 15-18 Credit Hours, if needed, to be determined by the Equivalence Committee, on case-to-case basis.

- BA/BSc with mathematics and a minimum 2nd Division (45% marks).

Provided that the candidates, if admitted shall be placed in 5th Semester of BS M+athematics.

Provided that they shall be offered bridging courses of 15-18 Credit Hours, if needed, to be determined by the Equivalence Committee, on case-to-case basis.

Definition of credit hour:

1 credit hour is 1 hour of theory lecture or 3 hours of laboratory work in a week

Table: 5 Under Graduate Education Policy: Effective from Fall-2023

S. No	Domain	Minimum requirements	MATH Workload Credit Hours
1	General Education	30	34
2	Allied Courses	12	12
3	Major	72	84
4	Internship/Field Study	03	03
5	Research Project	03	03
6	Teaching of the Holy Quran	Non-Credit (03)	
	Total Credit Hours		134

PROGRAM LAYOUT

Details are Given in the Following Table

Study Level		Particulars of Courses			Domain of Knowledge	
Year	Semester	Code	Title	CH.	Broad Domain	Sub Domai
1	1	**********	**********	3	Gen Ed.	A&H*
		**********	**********	3	Gen Ed.	F.Eng
		**********	Islamic Studies/Ethics (For Non-Muslims)	2	Gen Ed.	RE/Ethi

		**********	**********	3	Major********	
		**********	**********	3	Major	
		**********	**********	3	Major	
				17		
	2	**********	**********	3	Gen Ed.	SS**
		**********	Ideology and Constitution of Pakistan	2	Gen Ed.	ICP
		**********	**********	3	Gen Ed.	EW***
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	Teaching of the Holy Qur'an	3(3+0)	Compulsory Non Credit	
				17		
2	3	**********	**********	3	Gen Ed.	NS****
		**********	**********	3	Gen Ed.	QR*****
		**********	Entrepreneurship	3	Gen Ed.	CE
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3	Major	
				18		
	4	**********	**********	3	Gen Ed.	CCE
		**********	**********	3	Gen Ed.	QR
		**********	**********	3	Gen Ed.	ICT*****
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	Critical Study of Seerat al Nabi (SAWS)	3(3+0)	Compulsory Non Credit	
				18		
3	5	**********	**********	3	AC*******	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3		Free Space
				18		
	6	**********	**********	3	AC	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3	Major	

		**********	**********	3	Major	
		**********	**********	3		Free Space
				18		
4	7	**********	**********	3	AC	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3		Free Space
			Internship/Field Experience	3(0+3)		
				18		
	8	**********	**********	3	AC	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3	Major	
		**********	**********	3		Free Space
		**********	Capstone Project	3(0+3)		
				18		

- To be selected from a set of courses from General Education (Arts & Humanities) category.

** To be selected from a set of courses from General Education (Social Sciences) category.

*** To be selected from a set of courses from General Education (Expository Writing) category.

**** To be selected from a set of courses from General Education (Natural Sciences) category.

***** To be selected from a set of courses from General Education (ICT) category.

****** To be selected from a set of courses from General Education (Quantitative Reasoning) category.

******* To be selected from a set of courses (Allied/Interdisciplinary) category.

******** To be selected from a set of courses specific to major discipline.

********** Course Code, Title No. of Credit Hours and Detailed Contents to be devised by Board of Studies (BoS) of the respective departments, as per the following principles:

Every course shall be identified by a unique alpha-numeric code, comprising of three (03) to four (4) alphabets followed by three digits.

(a) The letters shall represent the major field of study.

(b) The first digit shall represent the level of the course (or the year in which the course is normally offered). For example; a course offered to the 2nd year students of BS/AD Programme will carry the digit 2.

(c) The second digit represents the broad area of the course within the Discipline. For the purpose, each department shall classify the courses offered into broad

areas. The digit "0" at this position normally refers to the basic introductory level general courses of the discipline.

(d) The third or the last digit stands for the sequence of the course offered in the same area.

Allied Courses for BS Mathematics

The courses A-1, A-2, A-3 and A-4 may be chosen from following titles. This list may be extended with consent of Board of Studies keeping in view the availability of expertise in the University.

A-1: Introduction to mechanics
A-2: Electricity & magnetism
A-3: Modern physics
A-4: Accounting

Elective Courses for BS Mathematics				
S. #	**Course Code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-441	Mathematical Statistics	Major	3(3-0)
2	MATH-451	Measure Theory-I	Major	3(3-0)
3	MATH-452	Measure Theory-II	Major	3(3-0)
4	MATH-473	Introduction to Fuzzy Set Theory	Major	3(3-0)
5	MATH-464	Numerical Solution for ODEs	Major	3(3-0)
6	MATH-465	Numerical Solution for PDEs	Major	3(3-0)
7	MATH-492	Affine and Euclidean Geometry	Major	3(3-0)
8	MATH-413	Graph Theory	Major	3(3-0)
9	MATH-431	Fluid Mechanics	Major	3(3-0)
10	MATH-493	General Relativity	Major	3(3-0)
11	MATH-453	Pointless Topology	Major	3(3-0)
12	MATH-461	Mathematical Modeling	Major	3(3-0)
13	MATH-484	Introduction to Fixed Point Theory	Major	3(3-0)
14	MATH-463	Mathematical Biology	Major	3(3-0)
15	MATH-474	Operations Research	Major	3(3-0)
16	MATH-423	Applied Algebra-I	Major	3(3-0)
17	MATH-423	Applied Algebra-II	Major	3(3-0)
18	MATH-322	Advanced Group Theory	Major	3(3-0)
19	MATH-483	Galois Theory	Major	3(3-0)
20	MATH-443	Advanced Topology	Major	3(3-0)
21	MATH-485	Convex Analysis	Major	3(3-0)
22	MATH-471	Optimization Theory	Major	3(3-0)

Semester-wise Break up

FIRST YEAR

Semester-I				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-101	Calculus-I	Major	3(3-0)
2	*	Major*	Major	3(3-0)
3	*	Major*	Major	3(3-0)
4	ENG-100	Functional English	Gen Edu	3(3-0)
5	**	General Education**	Gen Edu	3 (3-0)
6	IS-101/ ETHC-101	Islamic Studies/Ethics (For Non-Muslims)	Gen Edu	2 (2-0)
Total				**17**
Semester-II				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-102	Calculus-II	Major	3(3-0)
2	*	Major*	Major	3(3-0)
3	MATH-113	Set Theory and Mathematical logics	Major	3(3-0)
4	**	General Education**	Gen Edu	3 (3-0)
5	PS-101	Ideology and Constitution of Pakistan	Gen Edu	2 (2-0)
6	ENG-101	Expository Writing	Gen Edu	3 (3-0)
Total				**17**

SECOND YEAR

Semester-III				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-201	Calculus-III	Major	3(3-0)
2	*	Major*	Major	3(3-0)
3	MATH-241	Mathematical Techniques	Major	**3 (3-0)**
4	**	General Education**	Gen Edu	3 (3+0)
5	**	General Education**	Gen Edu	3 (2+1)
6	**	General Education**	Gen Edu	3 (2-1)
Total				**18**

Semester-IV				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-213	Ordinary Differential Equations	Major	3(3-0)
2	MATH-223	Linear Algebra	Major	3(3-0)
3	**	General Education**	Gen Edu.	(-0)
4	BBA-101	Entrepreneurship	Gen Edu.	**3** (3-0)
5	GC-101	Civics and Community Engagement	Gen Edu.	3 (2+1)
6		Teaching of the Holy Qur'an	Non-Credit Course	
Total				**14**

* To be selected from a set courses from Major discipline.
** To be selected from a set of courses from General Education category.

THIRD YEAR

Semester-V				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-321	Group Theory	Major	3(3-0)
2	MATH-335	Partial Differential Equations	Major	3(3-0)
3	MATH-351	General Topology	Major	**3** (3-0)
4	MATH-324	Computer Algebra System	AC	**3 (3-0)**
5	MATH-311	Numerical Analysis-I	Major	3(3-0)
6	MATH-301	Real Analysis-I	Major	3(3-0)
Total				**18**

Semester-VI				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-303	Complex Analysis	Major	3(3-0)
2	MATH-381	Rings and Fields	Major	**3** (3-0)
3	MATH-323	Differential Geometry	Major	**3 (3-0)**
4	MATH-312	Numerical Analysis-II	Major	3(3-0)
5	MATH-302	Real Analysis-II	Major	3(3-0)
6	MATH-332	Analytical Dynamics	AC	3(3-0)
Total				**18**

FOURTH YEAR

Semester-VII				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-443	Functional Analysis	Major	3(3-0)
2	XXXX	E-1	Major	3(3-0)
3	XXXX	E-2	Major	3(3-0)
4	XXXX	E-3	Major	3(3-0)
5	MATH-494	Internship/Field Study	Field Experience	**3 (3-0)**
Total				**15**

Semester-VI				
S. No.	**Course code**	**Course Title**	**Domain**	**Credit Hours**
1	MATH-491	Integral Equations	Major	3(3-0)
2	XXXX	E-1	Major	3(3-0)
3	XXXX	E-2	Major	**3 (3-0)**
4	XXXX	E-3	Major	3(3-0)
5	MATH-495	Capstone/Research Project	Capstone Project	**3** (3-0)
Total				**15**

Table-6: The following table shows, how the program courses meet the program objectives

Courses/Groups of Courses	Program Objectives											
	1	**2a**	**2b**	**2c**	**2d**	**2e**	**2f**	**2g**	**2h**	**2i**	**2j**	**3**
Compulsory Courses	√	√	√	√	√	√	√	√	√	√	√	√
Optional Courses	√	√	√	√	√	√	√	√	√	√	√	√
Practical		√	√	√	√	√	√	√	√	√		

Standard 2.2

Theoretical backgrounds, problems analysis and solution design must be stressed within the program's core material:

The following table reveals the elements with respect to "Theoretical background"' **"Problem analysis"' and "Solution design" as contained in compulsory and optional** papers.

Table: 7

Elements	Courses
Theoretical background	Almost all the compulsory and optional courses cover /stress the required elements to create the good understanding in the courses taught.
Problem analysis	The compulsory, Foundations and Major courses, deal with the required element to great extent on the basis of generalizability while the optional courses provide the analysis for a specific environment.
Solution design	A number of manual and computer-based practical are conducted to meet the required element.

Standard 2.3

The curriculum must satisfy the core requirements for the program, as specified by respective accreditation body:

The Department of Mathematics executes the functions on the basis of HEC requirements for its BS program.

The core requirements are mentioned at the end of curriculum designed by HEC. However, these requirements are not fully met by the department due to lack of some facilities in terms of equipment's and infancy stage of the department.

Standard 2.4

The curriculum must satisfy the major requirements for the program as specified by HEC, the respective accreditation body / councils

The department works under the major requirements laid down by the HEC. Such requirements are the part of the curriculum so far designed for the purpose.

Standard 2.5

The curriculum must satisfy general education, arts, and professional and other discipline requirements for the program, as specified by the respective accreditation body/council:

Table: 8

Program of Study	Math and Basic Science	Engineering topics	General Education	Other Disciplines
BS Mathematics	Yes	Nil	Yes	Yes

The Department offers four years BS Mathematics program comprising upon 9 compulsory, 7 general, 12 foundation, 12 major and 04 optional courses. The curriculum satisfies the requirements of many disciplines to be taught as minor subject.

Standard 2.6

Information technology component of the curriculum must be integrated throughout the program:

Almost all the courses/papers of Mathematics cover the different components of mathematic. Keeping in view some contemporary needs for mathematical tools, some more advanced techniques of Information Technology need to be incorporated in the curriculum. Hence, components of Information Literacy, Software and Database designing needs to be incorporated in the curricula by conducting a survey about the competencies needed in different courses settings.

Criterion-3

Laboratory And Computing Facilities

CRITERION-3: LABORATORY AND COMPUTING FACILITIES

All the courses of Mathematics program are practical-based for that purpose the University has provided the facility of computers and Information technology with in Departmental library. Therefore, the library acts as library as well as a computer lab. The computing facilities are available both for the teachers and students of the department.
The status of existing laboratory is as below:

- ❖ Laboratory Title: Library cum Laboratory (Lib./Lab.).
- ❖ Location Area: Department of Mathematics, Khushal Khan Khattak University, Karak
- ❖ Objectives:
  1. To handle the computer-based practical
  2. To develop codes and models for the solution of numerical and real-life problems.
  3. To develop practical skills for designing database, webpage, mathematic tools, and building Mathematics networking.
- ➢ Adequacy for Instruction: The computer lab comprised of 15 laptops which are utilized for conducting practical of all the courses but the existing facility is adequate to some extent that needs to be extended.
- ➢ Courses taught: All the courses are taught in class rooms and sometimes in computer lab for the purpose of practical.
- ➢ Software Available: The free of cost software are in use.
- ➢ Major Apparatus 15 Laptops, 1 printer, one Multimedia, one Photocopier and one scanner is available.

Standard 3.1

Laboratory manuals / documentation / instructions experiments must be available and readily accessible to faculty and students:

All students and teachers have adequate access to manual/documentation and instructions while using the laboratory. The computer lab is not compatible in terms of proper number of computers, mathematics software availability and other practical tools for conducting the practical works in all the papers being taught. The following shortcomings are noted which are hurdles on the way to keep the best pace of working environment for achieving the targets rested with the academic uplifting:

Shortcomings:

a. 1 Scanner

b. 20 Pcs
c. 3 Printers
d. A. V. aids
e. Digital camera
f. Practical tools latest.
g. Specialized training of information technology and MATLAB, Latex, Scientific work place.
h. Faculty with certain specialization.
i. Furniture and fixture.
j. Space for class rooms for teaching specialized/optional papers.
k. Course books
l. Mathematics Automation Software's
m. 3 Multimedia Projectors

Justification of above listed items:

The scanner and digital cameras are required to teach the students about the scanning and preserving the archival records in the library.

The items listed above i.e., b, c, & d are necessary for extending and upgrading the computer lab and facilitating the teachers for improving the practical works.

Acquiring the practical tools will upgrade the departmental library for the purpose of accessing required information whereas, the training facilities will create the skills required for teaching the courses in more conducive environment

The faculty and space are also required to teach the specialized papers in future along with furniture and fixture.

Availability of course related books will help the students to get the relevant and latest information about the field.

The availability of MATLAB software will help to provide the necessary trainings to the students.

Standard 3.2

There must be adequate support personnel for instruction and maintaining the laboratories:

The personnel support in shape of lab supervisor is not available; hence the maintenance of computer lab sometimes becomes a problem. The supervisor for computer lab is needed with the extended facilities in computer lab. At the moment, a non-professional employee is deputed to look after the matters of computer lab. Almost all the papers are computer-based-practical and hence a full-time computer lab supervisor can maintain the computer lab in functional order at the time of practical work in computer lab.

Standard 3.3

The University computing infrastructure and facilities must be adequate to support program's objectives:

The Khushal Khan Khattak University Karak has adequate and smart computing facilities with all sorts of support through the Department of Computer Science as and when required specially at the time of troubleshooting of the computers. Each of the

department (including Department of mathematics) of the university is equipped with Multimedia and a number of computers with internet connectivity. The internet connectivity is available in teacher's offices which facilitates the access to easy information at the time of urgency.

Criterion-4

Student Support and Advising

CRITERION-4: STUDENT SUPPORT AND ADVISING

A time of four years is fixed to complete the program on the basis of time management policy for all the curricula and co-curricular activities. The vocal students avail the time for interaction with their teachers relating to their present and future matters on the way. However, the passive students are motivated through other ways, the details of such motivation are ahead.

Standard 4.1

Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner.

The required and elective courses are offered in a logical sequence that grooms the students to obtain the program's defined objectives and outcomes. The faculty members teach the courses according to time table, designed to run the classes smoothly.

Standard 4.2

Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants.

Students are encouraged to communicate with teachers and para-teaching staff for their academic and co-curricular activities. The faculty includes highly qualified staff on regular basis so as to achieve the departmental objectives effectively. Overall, the faculty members are responsible for major areas of study on the basis of their subject competence. Most of the papers are completely taught by the individual teachers.

Standard 4.3

Guidance on how to complete the program must be available to all students and access to academic advising must be available to make course decisions and career choices.

a. ***Program requirements*** as whole students are informed through the Khushal Khan Khattak University Karak prospectus about the program requirements. The department-wise program requirements are updated annually at the start of current academic session to keep the matter in line with university policy in order to avoid any inconvenience. Moreover, a faculty member (being the student advisor) is available at departmental level to cope with all the program requirements and matters concerning to students' problems and day to day needs of their academic achievements.

b. Advising and students counseling system

A faculty member is deputed as Coordinator of Guidance and Career Counseling. The advising system in the department is run by the coordinator, who arranges the orientation lectures for the student's guidance and career counseling. The guidance and counseling process is based on all such activities which the students and the department feel necessary for the required achievements for their (students) prosperous career development. The department arranges some activities in this regard:

- Displaying advertisements of vacant posts appearing in daily newspapers for the information of the students to get familiar with the avenues where the opportunities exist for their career.

- Students are free to meet with the coordinator for seeking the guidance and counseling relating to their problems/matters.

- Sometimes students avail the opportunity of exchanging their views with guest speakers invited by the department.

- The students have the opportunity of interacting with the mathematics professionals who visit the department for some professional inputs and outputs. The students have also the opportunity to join the Pakistan Mathematical Association (PMA) as a student member of this professional body of national repute.

c. Incharge Students Affairs

To take care of certain academic and nonacademic matters of the students, the services of Incharge of Students Affairs are available for this purpose. The office of the Incharge Students Affairs deals with all the activities of scholarship, fellowships, workshops, and conferences, admissions for different categories, interdepartmental migration, re-admission and financial assistance for the student community. The office of students' affairs also makes plan for co-curricular activities, book fairs, Sports Gala/competitions and holding the annual convocation.

More or less, the students get a better opportunity of the services rendered by Students Advisor, Coordinator Students Guidance and Counseling and Director Students Affairs. However, the co-curricular activities need to be extended at large scale to break the hesitant and non-confident behaviors of the students. The extended co-curricular programs will provide a wide range exposure to the students for facing, bearing and tackling the issues in a coherent way.

Criterion-5

Faculty

CRITERION-6: FACULTY

Standard-6.1

There must be enough full-time faculties who are committed to the program to provide adequate coverage of the program areas/ courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D in the discipline.

The curriculum of HEC "comprised of 134 credit hours having 44 courses for BS Mathematics Program. The existing faculty is committed to run the program in a team work effort by letter and spirit. At the moment, two of faculty members hold Ph.D in the discipline whereas the rest are M.Phil degree holders.

The faculty should seek the opportunities of achieving the best level of competence by utilizing the time for conducting the researches and enhancing the qualification up to the level of Post Ph. D. The university should also motivate and facilitate the faculty to achieve the excellence in their subjects through certain opportunities of learning and upgrading the existing knowledge/competence.

Standard 6.2

All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, the effective programs for faculty development must be in place.

- The faculty members attend the seminars, workshops and conferences to keep them current in the discipline and browse the internet time to time for emerging trends in the discipline. Moreover, the faculty members exchange their professional views with their peers in order to avoid any misconception.
- All the courses in mathematics are practical-based and most of the faculty members teach three different papers, hence they rarely find time for writing their research papers. However, efforts are in pipeline to inculcate this trend.
- The facilities for participating in seminars and conferences are available for the faculty within the university and outside the university and the individual teacher avails this opportunity time to time.

Standartd-6.3

All faculty members should be motivated and have job satisfaction to excel in their profession.

The faculty of the department is motivated as they can win the facility of scholarship, availing of tenure track status on the basis of their intellect and ability. The opportunity of promotion is also available in the department provided they fulfill the criteria in this connection. The university also provides financial assistance to the faculty for writing and attending the research papers for the journals and conferences. All such opportunities and facilities are effective for the motivation and job satisfaction for the faculty in any way.

Criterion-6

Institutional Facilities

CRITERION-7: INSTITUTIONAL FACILITIES

Standard 7.1

The institution must have the infrastructure to support new trends in learning such as e-learning.

Infrastructure: The existing infrastructure of the department is established by the Khushal Khan Khattak University, Karak in terms of space and other facilities. The existing facilities needs to be upgraded specially in the field of E-learning because of speedily shifting of Mathematics discipline from conventional to E-learning approaches. To cope with the situation, the above listed shortcomings should be removed by acquiring the requisite equipment and resources.

Standard 7.2

The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.

The collection of reading material in the departmental library is not worthwhile that may fully support the academic activities in the department. The collection development in the departmental library is somewhat slow which hinders some learning options both for the teachers and the students. The departmental library houses about 1000 documents in the forms of books and theses (both soft and hard form), whereas the central library houses a very small collection of books on Mathematics. Both the central and departmental libraries do not subscribe any journal relating to mathematics except those which are available on line through digital library of HEC. The departmental library is manual-ridden system managed by the non-professional staff. The hiring of professional staff is likely to be made shortly. The departmental library needs to be computerized being a model library. The central library of the university should acquire the demanded books through its acquisition process.

Standard 7.3

Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.

Class-rooms and faculty offices: The class rooms and the faculty offices are adequate to some extent to carry out the academic, administrative and other sorts of related activities. All the faculty members don't have their separate offices except a few. The class room facilities are up to the mark in terms of proper furniture and multimedia. The multimedia facility is available also in the class rooms for the purpose of some specialized lectures. The faculty members feel a dire need of modern and smart computers in their offices which should be provided to boast the academic and research activities.

Criterion-7

Institutional Support

CRITERION-8: INSTITUTIONAL SUPPORT

The institution's support and the financial resources for the program must be sufficient to provide an environment in which the program could achieve its objectives and retain the strength required.

Standard 8.1

There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teacher and scholars.

The financial resources of the Department of Mathematics are allocated in the annual budget of the Khushal Khan Khattak University, Karak. The department has qualified faculty mostly with PhD degrees and each of them striving their best to maintain the competence by exchanging their professional views in professional gathering and attending seminars and workshops. The meager financial resources for the department are not compatible for the overall development of the department in terms of Lab expansion and the departmental library. The available secretarial support and office equipment are adequate to some extent to execute the daily functions of department.

Standard 8.2

There must be an adequate number of high quality graduate students, research assistants and Ph.D students

As the Department is at embryonic stage and has been established in 2019. That is why; the strength of the students is also minimal. The department currently offers BS Mathematics programs in fall semester 2019.

Table-9

Program of Studies	***2019***	***2020***	***2021***	***2022***
BS Mathematics	15	15+10=25	25+11=36	36+14=50
Research Assistants	***Nil***	***Nil***	***Nil***	***Nil***
Teacher/ Students Ratio	1:8	1:5	1:7	1:12

Standard 8.3

Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities

The meager resources for the Departmental Mathematics and the special mathematics lab become the hurdle in accessing some specific information for academic achievements of the students and faculty, however reading material is acquired in the departmental library through acquisition of the central library of Khushal Khan Khattak University on a very small scale. Similarly the department lacks the resources and facilities in terms of establishing the laboratory for individual subject practical. The computing facilities in the department are available to run the functions of the department but that needs to be extended.

ANNEXURES

Annexure-I

Faculty Resumes

Resume No. 3

Name	**Dr. Saeed Ullah Jan**
Personal	**Khushal Khan Khattak University Karak , Khyber Pakhunkhwa Pakistan** Phone#: 0927211895 Cell#: 03339274808 E-mail: saadullahjan2011@gmail.com saadullahjan2002@yahoo.com
Experience	1- Worked as HoD at Sarhd University Peshawar from May 02, 2012 to December 03,2015 (Evening program). 2- Worked as librarian at Higher education department, Government of Khyber Pakhtunkhwa, Peshawar from 25-09-1998 to 30-04-2012. 3- Teaching the subject of Library Science at College level for the above mentioned period. 4. Worked as Librarian at Central Library of Forest, Govt: of N-W.F.P (now Khyber Pakhtunkhwa) from 30-11-1995 to 24-09-2008.
Professional Affiliations	• Higher Education Commission Islamabad, National Committee for Curriculum Revision of Library and Information Science , Member • Sarhad University Peshawar, Board of Studies for Library and Information Science, Member • Bacha Khan University Charsadda. Board of Studies for Library and Information Science, Member • University of Peshawar, Board of Studies for Library and Information Science, Member • National Testing Services Pakistan, Subject committee in LIS, Developer.
Publications	**Research Paper Published Or In The Process Of Publication** 1- Jan, S. U., & Sheikh, R. A. (2011). Automation Of University Libraries: A Comparative Analysis Of Islamabad And Khyber Pukhtoon Khwa, Pakistan. Library Philosophy And Practice, (1), 21. 2- Jan, Saeed Ullah, Rafia A Sheikh & Sajjad Ullah Jan (2013). Technological Library Practices In Pakistan: Case Study Of Public Sector University Libraries. *Internal Journal Of Digital Library Services,3(1)* 3- Khan, I., Jan, S. U., & Khan, M. (2015). Determinant Of Capital Structure: An Empirical Study Of Cement Sector Of Pakistan. Asian Journal Of Management Sciences & Education Vol, 4(3).

	4- Ibrahim, M., & Jan, S. U. (2015). Bibliometric Analysis Of The Journal Of Pakistan Medical Association Form 2009 To 2013. JPMA. The Journal Of The Pakistan Medical Association, 65(9), 978-983. 5- Khattak, H., Mughal, A. W., SU Jan & Marwat, M. K. (2015). Perception Of The Students Of Sarhad University Regarding The Impact Of Different Systems Of Examination Upon Their Academic Performance. Asian Journal Of Management Sciences & Education, 4(2), 43-51. 6- Rehman,H, Saeed Ullah Jan And Mukhtiar Ali (2015). Awareness & Utilization Of Electronic Information Resources Among Medical Students. 23(4), 238-241 7- Jan, Saeed Ullah (2015). Use Of Internet By The Teaching Faculty Of Bacha Khan University,Charsadda Khyber Pakhtunkhwa.3(8),7-11 8- Zakria, Jan, Saeed Ullah And Zeshan (2015). Arts And Letters Ka Bibiliomteric Tajzia. 14(1), 336-341. 9- Jalal-Ud-Din, A. R., Ahmad, S. M., & Jan, S.(2015). Students' Perceptions Regarding Library Services In The Institute Of Education & Research (Ier), University Of Peshawar. 10- Jan, Saeed Ullah & Rafia A Sheikh (2014). Impact Of Emerging Technologies On University Libraries Of Pakistan.4(3), 56-69 11- Jan, Saeed Ullah & Rafia A.S (2013) Status Of Library Automation And Digitization In The Public Sector Universities Of Balochistan: A Case Study, *Pakistan Library Associatiojn Journal*,49-70 12- Jan, Saeed Ullah & Rafia A.S (2013). Modern Trends In University Libraries Of Pakistan *Sarhad University Of Science & Information Technology Peshawa*r, 1(1),478-485 13- Jan, Saeed Ullah & Rafia A.S and Sajjad Ullah Jan(2013). Technological Library Practices In Pakistan: A Case Study Of Public Sector University Libraries. *International Journal Of Digital Library Services,3(1), 22-33*
Theses & Books Published	1- Jan, Saeed Ullah (2012). *Modernization of University Libraries of Pakistan: case studies*. LAP LAMBERT Academic Publishing, Germany. 2- Jan, Saeed Ullah (2012). Digital Technology and its impact on Library and Information services and resources in the Public sector universities of Pakistan. Doctoral Research Thesis. *3*- Jan, Saeed ullah (2002). *Role of library in teaching of science education at secondary school level. A thesis submitted for the partial fulfillment of the Master degree in education.* Submitted to Allam Iqbal Open University, Islamabad for partial fulfillment for Master of Education.

	4- Jan, Saeed Ullah & Zia khan (2004). Data base design. A thesis submitted to Gomal University D.I.Khan for partial fulfillment for the award of MIT degree.
Conferences Seminars Workshops	1- Organized a workshop titled " New Horizon of LIS profession" in collaboration with HEC Islamabad at the DLIS, Khushal Khan Khattak University Karak from November 22-23,2016 2- Presented a paper in the international conference " 8th Qualitative and Quantitative Methods in Libraries," at University of London, UK, 27-30 May, 2016. 3- Presented Paper Titled "Impact Of Digital Technology On Library Services And Resources" In A Training Workshop Organized By Pakistan Academy For Rural Development (Pard), Peshawar, February 18-22, 2013. 4- Presented A Paper Titled "Modern Trends In University Libraries Of Pakistan" In 2nd International Multidisciplinary Conference: Towards Better Pakistan Organized By Sarhad University Of Science &It And Higher Education Commission Of Pakistan,24-25th September, 2012. 5- Presented A Paper Titled "Open Source Library Softwares In Pakistan" In One Day Seminar: Open Source Movement And Libraries, Organized By Sarhad University, Peshawar & University Of Azad Jammu & Kashmir, 17th October,2012. 6- Presented A Paper Titled "Technological Library Practices In Pakistan" In 5-Day Seminar On Library Management In Virtual Environment, Organized By Peshawar Universities Campus Librarians Associations, Bara Gali Summer Capmus, Abbotabad,2nd -6th June,2012. 7- Presented A Paper In The International Conference "1st Asian Conference On Literature And Librarianship" Organized By International Academic Forum, Osaka, Japan, 27-30 May, 2011. 8- Presented A Paper At "6th Pakistan Library Science Conference" University Of Peshawar , Baragali, Jun28-July2,2009. 9- Paper Accepted For Presentation In International Conference" Qualitative And Quantitative Research Methods In Libraries 2012" Limerick, Ireland,22-25, May,2012. 10- Participated In Workshop On "Library Automation Systems- Introduction And Practical Implementation Of Automation Software", Organized By Pakistan Academy For Rural Development (Pard) Peshawar, September 15-19, 2008 11- Participated in workshop on **""**"Library Automation and digitization software", organized by the Department of Library and Information Science, University of Peshawar, February 2-4, 2009

Resume No. 2

Name	**Dr. Muhammad Sajjad Ali Khan**
Personal	**Khushal Khan Khattak University Karak, Khyber Pakhtunkhwa Pakistan** **Cell#:** **03369107510** **E-mail:** sajjadalimath@yahoo.com **Other Information:** Father's Name: Gul Raib Khan Date of Birth: 28/02/1987 Religion: Islam Domicile: Bannu, KPK CNIC No.: 11101-5181538-1 Nationality: Pakistani Marital Status: Married Permanent Add: Kakki, Tehsil Kakki, District Bannu Postal Address: Mir Khani Street Kakki, P/O Kakki Language Known: Pashto, English, Urdu
Honors and Awards	PHD in Mathematics
Service Activity	Teaching
Experience	• Lecture in Mathematics, GPGC Bannu form sept 2015 to Feb 2018 • Work as a Lecturer in Mathematics, INS, Kohat University of Science and Technology, Kohat, from 12 Feb 2020 to 31 May 2021. • Work as an Assistant Professor (IPFP) in Department of Mathematics, Khushal Khan Khattak University, Karak, from May 31 to date.
Brief Statement of Research Interest	I have completed my PhD degree in Mathematics from Hazara University Mansehra. During my PhD, I have published 50 papers in different national and international well reported journals. Studies focused on Pure Mathematics and Applied Mathematics; in particular, my PhD study is focusing on Pythagorean hesitant fuzzy sets and their applications, beside this I have also done research work in the field of Fuzzy semigroup Theory and Logical Algebras. I have one and half year teaching experience at Kohat University of Science and technology. Recently I joint Department of Mathematics Khushal Khan Khattak University, Karak based on IPFP.
Publications	**(1)** **M. Sajjad Ali Khan**, A. S. Khan, I. A. Khan, F. Hussain and W. K. Mashwani, Linguistic Interval-valued Q-rung Orthopair fuzzy TOPSIS method for decision making problem with incomplete weight. Journal of Intelligent & Fuzzy Systems, DOI: 10.3233/JIFS-200845. **(IF: 1.851)** **(2)** **M. Sajjad Ali Khan**, S. Abdullah and K. Hilla, On the generalization an interval valued -fuzzy generalized bi-ideals in ordered semigroup, Applications and Applied mathematics: An international journal Vol. 16, Issue 1 (June 2021), pp. 237 – 267. **(ISI)** **(3)** **M. Sajjad Ali Khan**, S. Abdullah and K. Hilla, A more general form of interval valued fuzzy filters in ordered semigroups, Afrika Mathematics June, 2021. **(ISI)** **(4)** Tehreem, A. Hussain, J. R. Lee, **M. Sajjad Ali Khan** and D. Y. Shin, Analysis of

social networks by using Pythagorean Cubic Pythagorean fuzzy Einstein weighted geometric aggregation operators, Journal of Mathematics, (2021). **(IF: 0.971)**

(5) **M. Sajjad Ali Khan**, Faisal Khan, Joseph Lemley, Saleem Abdullah, Fawad Hussain, ***Extended Topsis Method Based on Pythagorean Cubic Fuzzy Multiple Criteria Decision-Making with Incomplete Weight Information,*** Journal of Intelligent & Fuzzy Systems, vol. 38, no. 2, pp. 2285-2296, 2020. DOI:10.3233/JIFS-191089 **(IF: 1.851)**

(6) I. A. Khan, A. S. Khan, S. Q. Jan, S. Islam, **M. Sajjad Ali Khan,** A. Ullah, ***Explication of the conserved quantities corresponding to the spacetimes carrying 10 Noether symmetries***, International Journal of Geometric Methods in Modern Physics, (2020) DOI:10.1142/S0219887821500535. **(IF: 1.287)**

(7) S. K. Mittal, M. Mittal and **M. Sajjad Ali Khan**, Ground-Level Water Predication Using Time Series Statistical Model, (2021) In book: Advances in Information Communication Technology and Computing.

(8) **M. Sajjad Ali Khan**, On More Generalized Fuzzy Interior Ideals in Semigroup (2020), In book: Handbook of Research on Emerging Applications of Fuzzy Algebraic Structures.

(9) **M. Sajjad Ali Khan**, S. Abdullah, Asad Ali, ***Multi-attribute group decision making based on Pythagorean fuzzy Einstein prioritized aggregation operators***, Int J Intell Syst. 2019 (34)1001-1033. **(IF: 7.229)**

(10) **M. Sajjad Ali Khan**, S. Abdullah, A. Ali, F. Amin and F. Hussain, ***Pythagorean Hesitant fuzzy Choquet Integral aggregation operators and their application to group decision making,*** Soft Computing 2019 (23):251–267. https://doi.org/10.1007/s00500-018-3592-0**.** **(IF: 2.784)**

(11) Aurangzeb, **M. Sajjad Ali Khan**, M. Ibrar, ***Approaches to multi-attribute decision making with risk preference under extended Pythagorean fuzzy environment***. Journal of Intelligent & Fuzzy Systems, 2019 (36):325–335. DOI:10.3233/JIFS-181385. **(IF: 1.637)**

(12) F. Khan , **M. Sajjad Ali Khan**, M. Shahzad, S. Abdullah, ***Pythagorean cubic fuzzy aggregation operators and their application to multi criteria decision making problems,*** Journal of Intelligent & Fuzzy Systems, 2019 (36):595–607. DOI: 10.3233/JIFS-18943 **(IF: 1.637)**

(13) S. Z. Abbas, **M. Sajjad Ali Khan** ,S. Abdullah, H. Sun and F. Hussain, ***Cubic Pythagorean fuzzy sets and their application to multi-attribute decision making with unknown weight information***, Journal of Intelligent & Fuzzy Systems 37(1): 1529-1544, 2019, DOI:10.3233/JIFS-18382. **(IF: 1.637)**

(14) **M. Sajjad Ali Khan,** ***The Pythagorean fuzzy Einstein Choquet integral operators and their application in group decision making***, Computational and Applied Mathematics (2019) 38: 128. **(IF: 1.260)**

(15) **M. Sajjad Ali Khan**, S. Abdullah, A. Ali, K. Rahman, F. Amin, F. Hussain, ***On Hyper BCH-algebras,*** Italian Journal of Pure and Applied Mathematics, 2019 (41)**:** 85-96. **(ISI)**

(16) **M. Sajjad Ali Khan**, A. Ali, S. Abdullah, F. Hussain, F. Amin and K. Rahman, ***On the generalization of (∈, ∈Vq)-intuitionistic fuzzy bi-ideals of semigroups***, Italian Journal of Pure and Applied Mathematics. 2019 (41) **:** 116-142. **(ISI)**

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Resume No.3

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Experience	• Lecturer in Department of Mathematics, Khushal Khan Khattak University, Karak: Teaching Bachelors since February 2015 till date.
Service Activity	1.Teaching 2.Department coordinator 3. Focal Person of Mathematics
Brief Statement of Research Interest	I have received M.Phil degree from University of UET Peshawar. My topic of research was General relativity: A case study of Khyber Pakhtunkhwa.
Publications	1. Proper homothetic vector fields of static space time in the general relativity.

Resume No. 4

Name	**Mr. Zaheer Anjum**
Personal	**Khushal Khan Khattak University Karak, Khyber Pakhtunkhwa Pakistan** **Phone#:** **Cell#: 03119718903** **E-mail:** **Other Information:** Father's Name Dost Ali Khan Date of Birth 04/01/1992 Religion Islam Domicile Karak CNIC No. 14203-9362320-3 Nationality Pakistani Marital Status Single Permanent Add: Village and P\O Ahmad Abad District Karak Postal Address: As above Language Known Pashto, English, Urdu
	•
Service Activity	1.Teaching
Brief Statement of Research Interest	M.PHIL Mathematics
Publications	NIL
Research Grants and Contracts	NIL

Resume No. 5

Name	**Mr. Naeem Abass**
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	•
Service Activity	1.Teaching
Brief Statement of Research Interest	M.PHIL Mathematic
Publications	NIL
Research Grants and Contracts	NIL

ANNEXURE-II

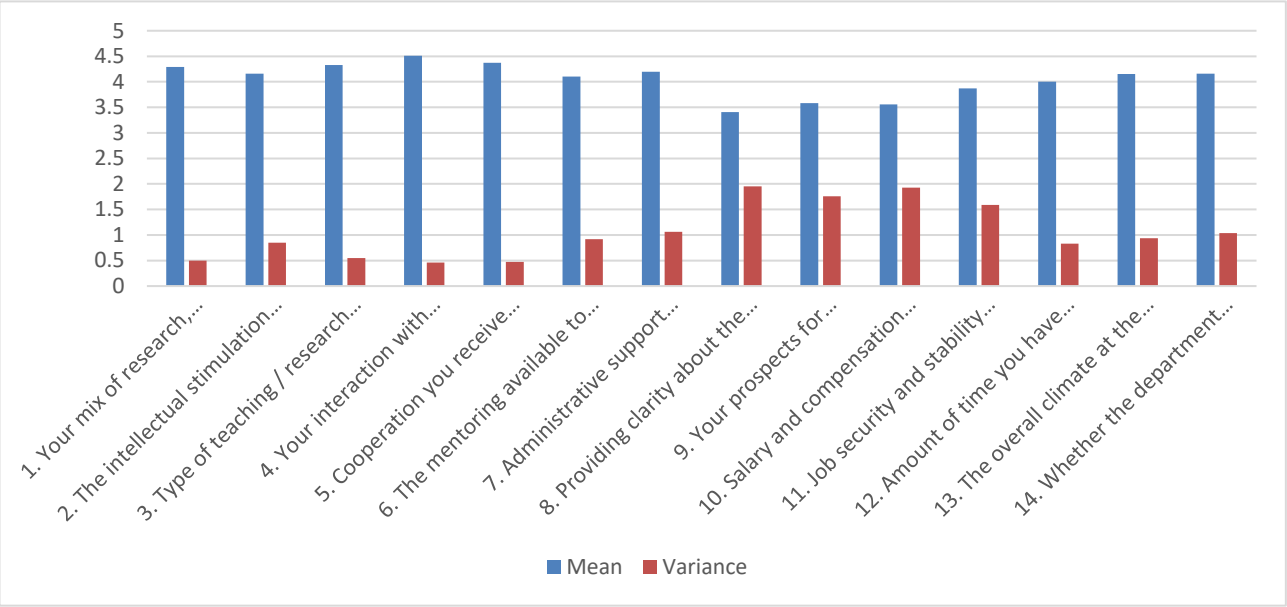
FACULTY SURVEY

Table 10
Faculty Survey

Groups	Count	Mean	Variance
1. Your mix of research, teaching and community service.	85	4.29	0.50
2. The intellectual stimulation of your work.	85	4.16	0.85
3. Type of teaching / research you currently do.	85	4.33	0.55
4. Your interaction with students.	85	4.51	0.46
5. Cooperation you receive from colleagues.	85	4.37	0.47
6. The mentoring available to you.	85	4.10	0.92
7. Administrative support from the department.	85	4.20	1.06
8. Providing clarity about the faculty promotion process.	85	3.41	1.95
9. Your prospects for advancement and progress through ranks.	85	3.58	1.76
10. Salary and compensation package.	85	3.56	1.93
11. Job security and stability at the department.	85	3.87	1.59
12. Amount of time you have for yourself and family.	85	4	0.83
13. The overall climate at the department.	85	4.15	0.94
14. Whether the department is utilizing your experience and knowledge	85	4.16	1.04

Figure

Faculty Survey Responses Display



Annexure-III

Teacher and Employer Evaluation Statistics

Table 11
Teachers Evaluation Survey

Teacher	Average
Mr. Shabbir Rehman	4.84
Ms. Anum Khalil	4.6
Dr. Muhammad Sajjad Ali Khan	5
Mr. Tariq Usman	4.9
Mr. Naqeeb Ullah	5
Mr. Junaid Khan	4.82
Dr. Muhammad Sajjad Ali Khan	4.82
Dr. Muhammad Sajjad Ali Khan	4.83
Mr. Shabbir Rehman	4.81
Mr. Waheed Ullah	4.67
Mr. Waheed Ullah	4.65
Ms. Ayesha Kalsoom	4.85

Figure

Teachers Evaluation Survey Display

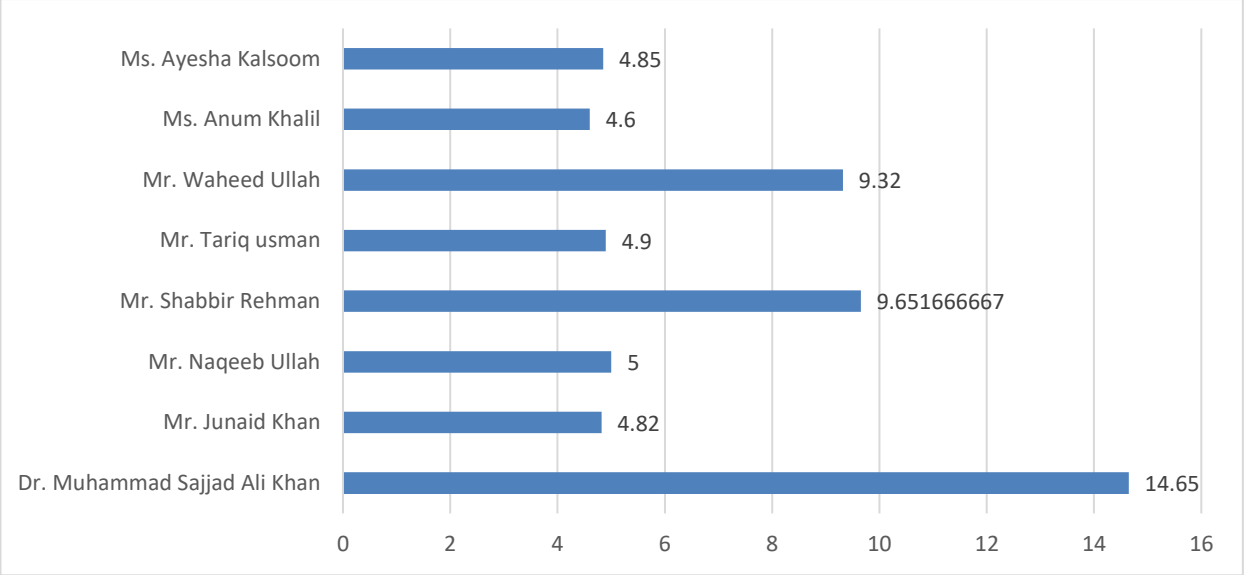
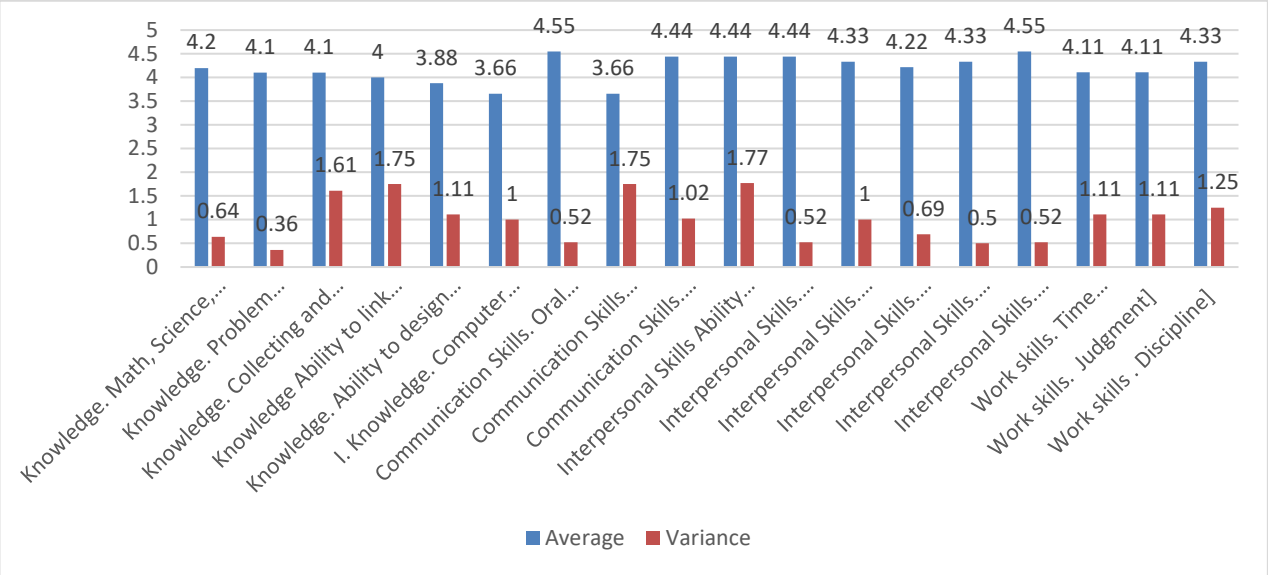


Table 12
Employer Survey Summary

Groups	N	Mean	Variance
Knowledge. Math, Science, Humanities and professional discipline, (if applicable)	9	4.2	0.64
Knowledge. Problem formulation and solving skills	9	4.1	0.36
Knowledge. Collecting and analyzing appropriate data	9	4.1	1.61
Knowledge Ability to link theory to Practice	9	4	1.75
Knowledge. Ability to design a system component or process	9	3.88	1.11
I. Knowledge. Computer knowledge.	9	3.66	1
Communication Skills. Oral communication	9	4.55	0.52
Communication Skills Report writing	9	3.66	1.75
Communication Skills. Presentation skills]	9	4.44	1.02
Interpersonal Skills Ability to work in teams]	9	4.44	1.77
Interpersonal Skills. Leadership]	9	4.44	0.52
Interpersonal Skills. Independent thinking]	9	4.33	1
Interpersonal Skills. Motivation]	9	4.22	0.69
Interpersonal Skills. Reliability]	9	4.33	0.5
Interpersonal Skills. Appreciation of ethical values]	9	4.55	0.52
Work skills. Time management skills]	9	4.11	1.11
Work skills. Judgment]	9	4.11	1.11
Work **skills.** Discipline]	9	4.33	1.25

Figure

Employer Survey Display



Appendix-IV

Student Courses Evaluation Questionnaire

Table 13

Student Courses Evaluation

+Subject	Course Code	Average
Calculus III	Math-232	4.86
Technical writing and Skills	Eng-234	4.6
Group Theory	Math-231	5
Computer Programming	Comp-236	4.9
Accounting	Acc-235	5
Moden Physics	Phy-233	4.82
Differential Geometry	Math-352	4.82
Real Analysis-I	Math-354	4.83
Number Theory	Math-355	4.81
Topology	Math-351	4.67
Auffine and Euclidean Geometry	Math-356	4.65
Complex Analysis I	Math-353	4.85

Figure

Student Courses Evaluation Display