## **Faculty of Basic Sciences and Humanities**

- 1. Department of Mathematical Sciences
- 2. Department of Physical Sciences
- 3. Department of Social Sciences

#### FACULTY OF BASIC SCIENCES AND HUMANITIES

#### **Vision, Mission Statement**

#### Vision

To be a world class department of Basic Sciences (natural and social) to inculcate technical knowledge, high moral values and soft skills in the students of Engineering and Sciences disciplines for the socioeconomic development of the country

#### **Mission**

The mission of the three Departments of Faculty of Basic Sciences and Humanities is to realize the above vision and those of the university by:

- Preparing undergraduate students to enter their specializations smoothly
- Providing students with the means for clear, creative, informed and critical scientific thinking
- Stimulating a passion for lifelong learning in various modes of engineering and sciences
- Promoting and utilizing the importance of effective Engineer-scientist's collaboration in national interest
- Promoting mathematics and physics within the context of a liberal education at postgraduate level particularly and undergraduate in general
- Grooming personalities with the principals of honesty, diligence and teamwork

### > Aims and Objectives

#### Aim

The aims of the Departments are to strengthen the fundamentals of basic sciences by brushing up the concepts and knowledge in various subjects such as Physics, Math, Chemistry, English, Pakistan Studies and Islamic Studies for the students of Engineering and Sciences departments of the University. Today, the Faculty is responsible for covering 30-40 % of the curriculum of all the existing Engineering Programs in UET Taxila. In addition to playing a vital and primary role of supporting other Departments of Engineering faculties, the faculty has also started degree

programs in Physics and Mathematics at undergraduate and postgraduate levels with the same supportive theme for Engineering faculties of UET Taxila.

### **Objectives**

The main and primary objectives of the Faculty are:

- To provide a stimulating and effective learning in the basic mathematical and physical sciences that establishes the highest international standards of the university
- To provide students with essential and sufficient background in the subject of basic sciences and humanities as required by their departments
- To enforce the necessity and advantage of having multidisciplinary education to graduates that enriches the analytical capabilities for leading a successful life
- To help the students overcome their weaknesses in the application of concepts of mathematics, science and communication skills

1. Department of Mathematical Sciences

**About: Department of Mathematical Sciences** 

Department of Mathematical Sciences was previously a part the Department of Basic Sciences,

which was established in 1975 as a part of the University College of Engineering, Taxila and is

as old as the institution itself. With the inception of the institute as a University in 1993, the

Department has been placed under the Faculty of Basic Sciences & Humanities. Now, the Basic

Sciences Department has been re-structured and split into three independent departments,

namely, (i) Department of Mathematical Sciences, (ii) Department of Physical Sciences, and (iii)

Department of Humanities and Social Sciences.

The Department of Mathematical Sciences offers three degree programs: a four-year

undergraduate program leading to BS degree in Mathematics, two-year postgraduate program

leading to MS degree in Mathematics, and PhD Mathematics degree program. While MS and

PhD programs are running since 2014, the BS Mathematics is newly introduced by the

Department at the University. The first intake of students in BS Mathematics is planned for the

Fall-2022 session. In addition, the Department is also responsible to teach the mathematics and

statistics courses to all undergraduate programs in each Engineering Faculty.

**Contact Information** 

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## **Faculty Profile:**

#### Dean

Prof. Dr. Aftab Ahmad

#### **Chairman**

Dr. Muhammad Muddassar

### **Associate Professors**

Dr. Muhammad Muddassar

PhD Mathematics (UET, Lahore)

### Dr. Nasir Siddiqui

PhD Mathematics (QAU, Islamabad)

### **Assistant Professors**

Ms. Safeera Batool

M. Phil Mathematics (QAU, Islamabad)

#### Dr. Zaffer Elahi

PhD Mathematics (PU, Lahore)

#### Dr. Azeem Shahzad

PhD Mathematics (QAU, Islamabad)

### Dr. Muhammad Altaf

PhD Statistics (USTC, China)

### Dr. Muhammad Touqeer

PhD Mathematics (PU, Lahore)

### <u>Lecturers</u>

Ms. Andleeb Abbasi

M.Phil Mathematics (QAU, Islamabad)

#### Ms. Sumaira Rashid

M.Phil Mathematics (QAU, Islamabad)

### Mr. Syed Zulgarnain Haider

M.Phil Mathematics (QAU, Islamabad)

### Dr. Syed Sabyel Haider

PhD Mathematics (NUST, Islamabad)

#### Ms. Haleema Sadia

M.Phil Mathematics (QAU, Islamabad)

### Dr. Jawad Ahmed

PhD Mathematics (QAU, Islamabad)

# **Programs:**

- BS Mathematics
- MS Mathematics
- PhD Mathematics

# **Undergraduate Programs:**

The course curriculum for BS Mathematics is designed in such a way that it contains a set of core courses and, in addition, and a set of non-disciplinary and general education courses. The core courses allow the student to specialize in the subject of mathematics. The aim of the non-core courses is to develop several soft skills and moral/ethical values in the graduating students.

## **Courses:**

B.S. Mathematics Semester I		Cre	dit Hrs.
		Theory	Lab
Gen Ed/Culture	Islamiat / Ethics	2	
Gen Ed/Language	Functional English	2	
Non-Disp/CS	Computing Fundamentals	2	1
Math	Calculus and Analytic Geometry	3	
Gen Ed/Nat Sc	History/Foundation of Mathematics	3	
Non-Disp/Physics	Physics-I (Basic Mechanics)	2	1
Qur'an	Qur'an Translation I (Imaniaat)	1	
	Total	15	2

B.S. Mathematics Semester II		Credit Hrs.	
		Theory	Labs
Gen Ed/Culture	Pakistan Studies	2	
Gen Ed/Language	Technical Report Writing	2	
Non-Disp/Physics	Physics –II (Electricity and Magnetism)	2	1
Math	Linear Algebra – I	3	
Math	Vectors and Tensor Analysis	3	
Gen Ed/ Nat Sc.	General Chemistry I	2	1
	Total	14	2

B.S. Mathematics Semester III		Credit Hrs.	
		Theory	Labs
Gen Ed/Language	Communication and Presentation Skills	2	
Non-Disp/Physics	Physics –III/ Modern Physics	2	1
Non-Disp/Statistics	Descriptive Statistics	3	
Math	Multivariable Calculus	3	
Gen edu	Quantititive Reasoning - I	2	1
Math	Infinite Series	3	
Qur'an	Qur'an Translation I (Ibadaat)	1	
	Total	16	2

B.S. Mathematics Semester IV		Credit Hrs.	
		Theory	Lab
Math	Waves and Oscillations	3	
Math	Complex Analysis	3	
Math	Discrete Mathematics	3	
Non-Disp/Statistics	Inferential Statistics	3	
Math	Number Theory	3	
Gen Ed/SOC	Social Psychology	3	
	Total	18	

B.S. Mathematics Semester V		Credit Hrs.	
		Theory	Labs
Math	Real Analysis-I	3	
Math	Numerical Methods with Programming	2	1
Math	Group Theory – I	3	
Math	Metrics and Topology	3	
Gen Ed/SOC	Professional Ethics	3	
Qur'an	Qur'an Translation I (Mua'amlaat)	1	
	Total	15	1

B.S. Mathematics Semester VI			Credit Hrs.	
			Theory	Labs
Math	Mathematical Methods of Physics-I		3	
Math	Differential Geometry		3	
Math	Introductory Functional Analysis		3	
Math	Abstract Algebra – I		3	
Math	Operations Research/Math programming and Optimization		2	1
Gen Ed/MGT	Project Management		3	
	T	'otal	17	1

B.S. Mathematics Semester VII		Cre	Credit Hrs.	
		Theory	Lab	
Gen EdMGT	Leadership and Enterprenuarship	3		
Math	Distribution Course –I	3		
Math	Distribution Course – II	3		
Math	Distribution Course – II	3		
Math	FYP – I	3		
Qur'an	Qur'an Translation I (Ikhlaqiaat)	1		
	Tota	al 16		

B.S. Mathematics Semester VIII		Credit Hrs.	
		Theory	Labs
Math	Introduction Mathematical Modeling	3	
Math	Distribution Course –IV	3	
Math	Distribution Course –V	3	
Math	Distribution Course –VI	3	
Math	FYP-II	3	
	Total	15	
	Program Total Credit Hours (132)	126	8

### **List of elective courses:** All following courses are 3+0 credit hours.

1	Numerical	Linear	Algebra
1.	Numerical	Lillear	Aigebia

- 2. Linear Algebra II
- 3. Real Analysis II/Topics in Analysis
- 4. Fuzzy Set Theory
- 5. Graph Theory
- 6. Measure Theory
- 7. Fixed Point Theory
- 8. Introduction to Logic
- 9. Functional Analysis II
- 10. Complex Analysis
- 11. ODE and PDE II
- 12. Axiomatic Set Theory
- 13. Combinatorial Mathematics
- 14. Math Programming & Optimization II
- 15. Linear Statistical Models
- 16. Time Series Analysis
- 17. Probability and Random Processes
- 18. Nonlinear Waves
- 19. Heat and Thermodynamics
- 20. Complex Analysis

- 21. Lie-Symmetry Analysis
- 22. Solitary Wave Solutions
- 23. Dynamical Systems
- 24. Algorithms and Software Concepts
- 25. Data Curation, Management, Organization
- 26. Statistical Modeling
- 27. Statistical and Machine Learning
- 28. Fundamentals of Data Science
- 29. Data Science I
- 30. Data Science II
- 31. Mathematical Physics –II
- 32. Computational Physics
- 33. Statistical Physics
- 34. Classical Mechanics
- 35. Nuclear Physics
- 36. Atomic & Molecular Physics
- 37. Relativity
- 38. Riemannian Geometry
- 39. Physics IV
- 40. Introduction to Wavelets
- 41. Image Processing

2. Department of Physical Sciences

The Department of Physical Sciences is a teaching and research department of the University of

Engineering and Technology, Taxila. The Department was previously a part of the Department

of Basic Sciences, which was established in 1975 as a part of the University College of

Engineering, Taxila and is as old as the institution itself. With the inception of the institute as a

University in 1993, the Department was placed under the Faculty of Basic Sciences &

Humanities. Now, the Basic Sciences Department has been re-structured and split into three

independent departments: the Department of Physical Sciences is one of them.

The Department of Physical Sciences offers two degree programs: a four-year undergraduate

program leading to BS degree in Physics and two-year postgraduate program leading to MS

degree in Physics. While MS Physics program is running since 2014, the BS Physics is newly

introduced by the department at the university. The first intake of students in BS Physics is

planned for the Fall-2022 session. In addition, the Department is also responsible to teach the

physics and chemistry courses to undergraduate programs in each Engineering Faculty.

**Contact Information** 

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# **Faculty Profile:**

Dean

Prof. Dr. Aftab Ahmed

Chairman

Dr. Muhammad Muddassar

**Associate Professors** 

Dr. Malik Sajjad Mehmood

PhD Physics (PIEAS, Islaabad)

**Assistant Professors** 

Dr. Muhammad Sultan

PhD Chemistry (QAU, Islamabd)

Dr. Muhammad Nadeem Badani

PhD Physics (UTM, Malaysia)

**Lecturers** 

Dr. Kulsoom Rahim

PhD Physics ( QAU, Islamabad)

Dr. Muhammad Tariq

PhD Physics (Germany)

## **Programs:**

- BS Physics
- MS Physics

## **Undergraduate Programs:**

The BS physics program prepares the students academically to pursue a scientific, academic, or technical career in all branches of physics. The course curriculum for BS Physics is designed in such a way that it contains a set of core courses and, in addition, and a set of non-disciplinary and general education courses. The core courses allow the student to specialize in the subject of physics. The aim of the non-core courses is to develop several soft skills and moral/ethical values in the graduating students.

### **Courses:**

Semester I		Credit Hrs.	
		Theory	Lab
Gen Ed/ Language	Functional English-I	3	
Non-Disp/Math	Calculus and Analytical Geometry-I	3	
Non-Disp/CS	Introduction to Computing	3	
Phy	Mechanics	3	
Non-Disp/Che	Chemistry-I	2	1
Gen Ed/Culture	Islamic Studies/Ethics	2	
Phy	Lab I - Mechanics		1
Qur'an	Qur'an Translation I (Imaniaat)	1	
	Total	17	2

Semester II		Credit Hrs.	
		Theory	Labs
Gen Ed/Language	Technical Report Writing	3	
Non-Disp/Math	Calculus and Analytical Geometry-II	3	
Phy	Electricity & Magnetism	3	
Phy	Heat & Thermodynamics	3	
Gen Ed/Culture	Pakistan Studies	2	
Non-Disp/Che	Chemistry-II	2	1
Phy	Lab II - Electricity & Magnetism		1
	Total	16	2

Semester III		Credit Hrs.	
		Theory	Labs
Gen Ed/Language	Communication and Presentation Skills	3	
Non-Disp/Math	Linear Algebra	3	
Phy	Waves & Oscillations	3	
Phy	Modern Physics	3	
Non-Disp/Eco	Economics	3	
Phys	Lab III – Heat, waves, and sound		1
Qur'an	Qur'an Translation I (Ibadaat)	1	
	Total	16	1

Semester IV		Credit Hrs.	
		Theory	Lab
Non-Disp/Math	Differential Equations	3	
Non-Disp/Statistics	Probability & Statistics	3	
Phy	Optics	3	
Non-Disp/CS	Introduction to Programming	3	
Gen Ed/Mgt	Project Management	3	
Gen Ed/Soc	Introduction of Psychology	2	
Phy	Lab IV – Optics		1
	Total	17	1

Semester V		Credit Hrs.	
		Theory	Labs
Phy	Mathematical Methods of Physics-I	3	
Phy	Electrodynamics-I	3	
Phy	Classical Mechanics	3	
Phy	Electronics-I	3	
Gen Ed/Soc	Professional Ethics	2	
Phy	Lab V – Electronics		2
Qur'an	Qur'an Translation I (Mua'amlaat)	1	
	Total	15	2

Semester VI			Credit Hrs.	
			Theory	Labs
Phy	Mathematical Methods of Physics-II		3	
Phy	Electrodynamics-II		3	
Phy	Quantum Mechanics-I		3	
Phy	Electronics-II		3	
Phy	Statistical Physics		3	
Phy	Lab VI – Modern physics, spectroscopy			2
Qur'an	Qur'an Translation I (Ikhlaqiaat)		1	
	7	<b>Cotal</b>	16	2

Semester VII		Credit Hrs.	
		Theory	Lab
Phy	Quantum Mechanics-II	3	
Phy	Atomic & Molecular Physics	3	
Phy	Solid State Physics-I	3	
Phy	Nuclear Physics	3	
Phy	Elective-I	3	
Phy	Lab VII – Atomic physics, solid state physics,		2
	Total	15	2

Semester VIII		Credit Hrs.	
		Theory	Labs
Phy	Solid State Physics-II	3	
Phy	Elective-II	3	
Phy	Elective-III	3	
Phy	Elective-IV	3	
Phy	Research Project	3	
	Total	15	
	Program TotalCredit Hours(139)	127	12

## **List of elective courses:** All following courses are 3+0 credit hours.

- 1. Techniques of Experimental Physics,
- 2. Computational Physics, Laser Physics,
- 3. Plasma Physics,
- 4. Introduction to Quantum Information and Computation,
- 5. Condensed Matter Physics, Particle Physics,
- 6. High Energy Physics,
- 7. Introduction to Material Science,
- **8.** Introduction to Photonics,
- 9. Radiation Physics,
- 10. Nanoscience and Nanotechnology,
- 11. Environmental Physics,

## 3. Department of Social Sciences

Like Departments of Mathematical Sciences and Physical Sciences, the Department of Humanities & Social Sciences was also previously a part the Department of Basic Sciences, which was established in 1975 and is as old as the institution itself. The Department of Humanities and Social Sciences is responsible for teaching various humanities and social sciences courses to all undergraduate programs in each Engineering and Sciences Faculty. Courses taught by the department are:

- Quran Translation
- English/Technical Report Writing
- Communications Skills
- Islamic Studies
- Pakistan Studies
- Management Sciences
- Social Sciences
- Professional Ethics
- Sociology

#### **Contact Information**

### Faculty of Basic Sciences and Humanities

#### Department of Mathematical Sciences

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PhD Pakistan Studies (QAU, Islamabad)

Ms. Fareeha Zaheer

M. Phil. English (Air University, Islamabad)

**Lecturers** 

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M. Phil. English (Air University, Islamabad)

Ms. Tehmina Farrukh

M. Phil. English (Air University, Islamabad)

Dr. Syed Muhammad Abdur Rehman

MA Islamiyat (UOS)

MSc Economics (QAU, Islamabad)

MS Islamics Banking and Finance (IIUI)

PhD Islamics Banking and Finance (IIUI)

Dr. Sabahat Jaleel

PhD Pakistan Studies (QAU, Islamabad)

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