RIPHAH
INTERNATIONAL UNIVERSITY

Prospectus

FACULTY OF ENGINEERING & APPLIED SCIENCES

INSPIRATION INNOVATION & DISCOVERY

FACULTY OF ENGINEERING & APPLIED SCIENCES

Contents

VISION & MISSION

University Vision

1. To excel in development of a holistic value based research, education and training programs.

2. To establish at national and international levels, state of the art educational, research, training institutions, in line with international best practices, with integration of universal Islamic ethical values and Pakistan ideology, in order to produce dynamic human beings.

3. To develop and implement educational strategies, problems based academic programs, teaching material, report, surveys and research material to enhance the quality of education and training in various disciplines in higher education.

4. To play leadership role at national and international levels in systematic reforms *(islah)*, transformation *(tazkiah)*, creation of tolerance and forbearance *(sabr, istaqmah)* and innovative solutions *(ijihad)* for social change.

5. To establish model institutions particularly in holistic health care, in order to improve quality of life of the needy in society.

University Mission

"Establishment of State of the Art Educational Institutions with a focus on Inculcating Islamic Ethical Values".

Riphah Values

اَلآخِرَة

AL-AKHIRAH
(Akhirah Oriented Decisions)

إِتْقَان

ITQAN
(Pursuit of Excellence)

مُشَاوَرَة

MUSHAWARAH
(Consultation & Harmony)

إِجْتِمَاعِيَّة

IJTIMAIYYAH
(Team Work)

رَحْمَة

RAHMAH
(Compassion)

مُحَاسَبَة

MUHASABAH
(Accountability)

Faculty of Engineering and Applied Sciences

FACULTY OF ENGINEERING AND APPLIED SCIENCES

It is my pleasure to introduce you, the Faculty of Engineering and Applied Sciences (FEAS), Riphah International University, Islamabad. I am both humbled and honoured by the great responsibility bestowed upon me to take the FEAS to greater heights in academic and research excellence. FEAS is one of the oldest and leading faculties of the University which presently consists of following departments:

1. Department of Electrical Engineering
2. Department of Biomedical Engineering
3. Department of Mathematics & Statistics
4. Department of Physics

Both the undergraduate programs i.e. BSc Electrical and Biomedical Engineering are duly accredited by Pakistan Engineering Council (PEC) under Washington Accord and are in-line with Higher Education Commission (HEC). By virtue of this accreditation, the degrees conferred by the FEAS would be reckoned as substantially equivalent to the degrees awarded in the signatories of the Washington Accord members (USA, UK, Australia, Canada, Singapore, Malaysia, South Korea, Hong Kong, Russia and China etc.) In addition, postgraduate programs including MS and PhD Electrical Engineering, MS and PhD Biomedical Engineering are also offered.

The undergraduate and graduate programs are being taught under semester system of education. The curricula of the programs are designed and developed as per guidelines and recommendations of the PEC and HEC. In order to cater for the practical and research requirements of the programs, state-of-the-art labs have been developed and maintained. It is ensured that our graduates get comprehensive hands-on-experience on the latest equipment in the respective areas. Besides, the students are groomed to get expertise on solving of engineering and applied sciences complex-problems in real-life. Therefore, the students are trained in such a way that they meet the market requirements and thus get absorbed at earliest in the respective industries.

The importance of Basic Sciences in the Universities is like a heart-beat in human body. The Basic Sciences are essential for proper understanding the technical subjects, promoting research work, widening the vision for the future and enhancing the quality and authenticity in Sciences. The subjects of Basic Sciences: Mathematics, Physics, Statistics play a vital role in the development of a country. We are committed to produce competent, motivated and socially responsible Mathematicians, Physicists and Statisticians that they can build the good traditions through education and to participate actively in the development of country. PhD, MPhil, MSc and BS Programs are simultaneously offered in Mathematics, Statistics and Physics department.

Presently, there are about 3505 undergraduate and graduate students in FEAS. Highly qualified teachers including 65 PhDs are hired in the faculty who got rich academic and research experience. Various research groups are involved in research activities which produce quality work in their respective areas. Our faculty is actively involved in thematic, applied and multi disciplinary research and thus FEAS is the highest research-producing faculty of the University.

I assure you of quality education, cutting-edge research and conducive environment so please have a "seeing is believing visit" of our campus.

Prof. Dr. Jameel Ahmed
Dean, FEAS

FEAS, Research Publications, January-2020 to March-2021

Department	Impact Factor Publications	Non-Impact Factor Publications	Conference Papers
Electrical Engineering	26	4	10
Biomedical Engineering	13	0	6
Physics	39	0	0
Mathematics & Statistics	164	0	0
	242	**4**	**16**

Comparision of FEAS Research Publications with Other Faculties

3 Years Impact Factor Research Publications FEAS

- FEAS
- University

	2018	2019	2020
FEAS	56.44 %	78.61%	60.49
University	43.56 %	21.39 %	39.41
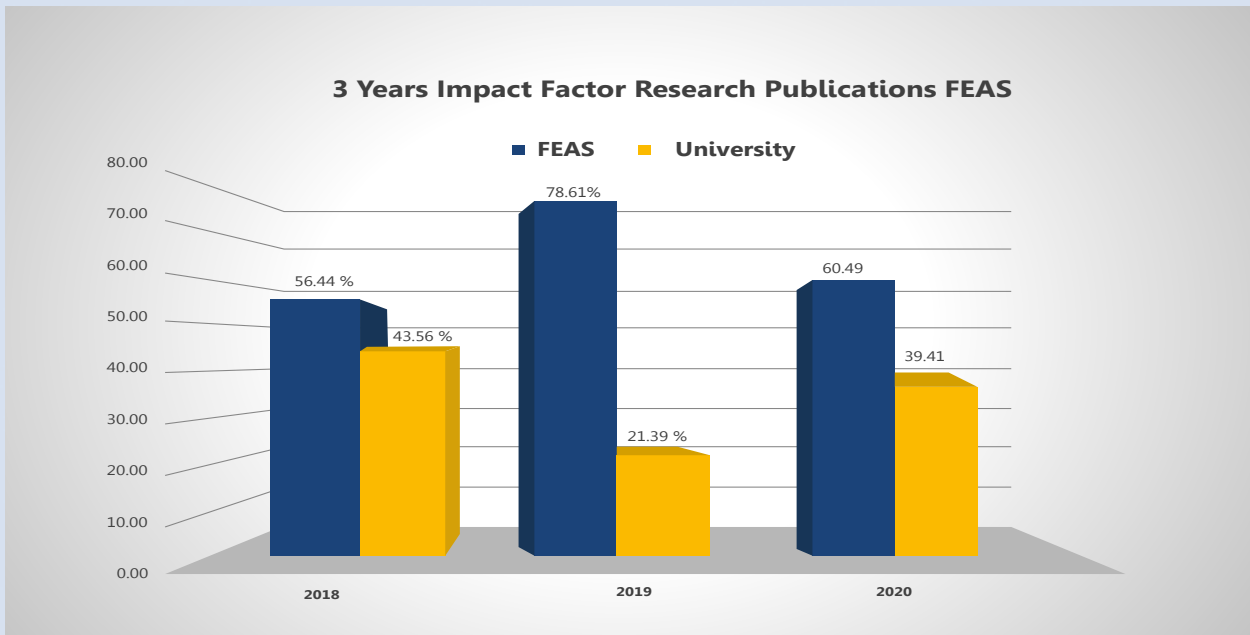
Faculty Mission

To produce graduates having sound knowledge, cutting-edge skills and positive attitude with respective disciplines alongwith inculcation of Islamic ethical values.

Program Educational Objetives (PEOs)

BSc Electrical Engineering Program

BSc Biomedical Engineering Program

PEO-1	Graduates will be proficient engineers serving in industries and academia or engage themselves in entrepreneurial activities.
PEO-2	Graduates will exhibit adaptation to advancements in knowledge for creating solutions of complex engineering problems.
PEO-3	Graduates will contribute as effective team members and managers in their organizations.
PEO-4	Graduates will exhibit islamic ethical values and demonstrate commitment to their responsibility toward sustainability and safety of society and environment.

Program Learning Outcomes (PLOs)

BSc Electrical Engineering Program

BSc Biomedical Engineering Program

PLO-1	**Engineering Knowledge**	An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PLO-2	**Problem Analysis**	An ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PLO-3	**Design/Development of Solutions**	An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PLO-4	**Investigation**	An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
PLO-5	**Modern Tool Usage**	An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.
PLO-6	**The Engineer and Society**	An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.
PLO-7	**Environment and Sustainability**	An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PLO-8	**Ethics**	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PLO-9	**Individual and Team Work**	An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.
PLO-10	**Communication**	An ability to communicate effectively, orally as well as in writing, on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PLO-11	**Project Management**	An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.
PLO-12	**Lifelong Learning**	An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

Department of
Electrical Engineering

Faculty of Electrical Engineering Department

Department of
ELECTRICAL ENGINEERING

I welcome all of my prospective students to the Electrical Engineering (EE) Department, FEAS. I believe, technical education serves as a bridge between academics and professional careers. Besides, providing cutting-edge technical education, we, at RIPHAH, also focus on personality development for the competitive years ahead. At one end, our students pass through a rigorous academic system in compliance with Washington Accord, while we keep the balance by providing them opportunities for various co-curricular activities; which in turn grooms the overall personality of our students.

As far as the Department is concerned, academic standards and practical work are the two key parameters. The Department of EE has a fine blend of renowned as well as young and dynamic personalities as faculty, who are involved in imparting quality education. The faculty strives to foster and encourage a teaching methodology that enables a strong theoretical foundation leading to a hands-on practical approach.

Our graduates are serving in various national and multinational companies. Some have established themselves as successful entrepreneurs while others are continuing higher education in renowned national and international universities. We strive to follow the motto of quality teaching and productive research with a strong focus on the inculcation of Islamic ethical values while keeping in view the vision of transforming Pakistan's economy into a knowledge-based economy through our skilled engineers and entrepreneurs.

Our goal is to prepare our students for the life challenges that they will face immediately after completing their degrees. I once again, welcome all those students who are energetic and ambitious to join our venture of quality outcome-based education in Pakistan.

Dr. Sohail Khalid
Associate Professor, HOD

Faculty of
ELECTRICAL ENGINEERING DEPARTMENT

Dr. Jameel Ahmed

Designation:	Professor & Dean
Qualification:	Post Doctorate, Nanyang Technological University (NTU), Singapore
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BSc Electrical Engineering Program

BSc Electrical Engineering is a broad-based bachelor degree program which includes study of subjects like Digital and Analog Electronics, Electromagnetic Field, Control Systems, Communication Systems, Power Engineering etc. To support the program, state-of-the-art laboratories along with qualified staff are available in the Department.

After completion of the program, BSc Electrical Engineering degree is conferred upon the students.

The program spans over four years (eight semesters) and comprises 138 credit hours. The semester-wise breakup of curriculum is given on subsequent pages.

Eligibility Criteria

F.Sc. Pre Engineering minimum 60% marks

OR

"A" levels equivalent to F.Sc. Pre Engineering minimum 60% marks

OR

DAE in Electrical, Telecommunication, Electronics, Avionics & Instrumentation with minimum 60% marks (Limited Seats as per PEC recommendation)

Duration:

4 years (8 semesters)

Available Seats:

100 seats

Selection Criteria:

Candidates are required to take Riphah's entry test.
F.Sc.   70%
Entry Test/ Interview   30%

Interview:

An interview will be conducted for finalizing the admission to the subject discipline.

Scholarships

Talent Scholarships for 1st Semester Electrical Engineering

%age of marks Obtained in Intermediate Annual/Percentage based system	Scholarship %age of Tuition Fee)
85% and above	100%
80% to 84.99%	65%
75% to 79.99%	35%
70% to 74.99%	25%
60% to 69.99%	20%

Class Timings:

8:00 am to 4:00 pm

Semester-1

Code	Course Title	Theory	Lab	Combined
EEL-101	Engineering Workshop	0	2	2
EE-102	Electric Circuits	3		
EEL-102	Electric Circuits		1	4
BS-101	Calculus and Analytical Geometry	3	0	3
CS-101	Computer Fundamentals	3		
CSL-101	Computer Fundamentals		1	4
HU-101	Communication Skills	3	0	3
Total Semester Credit Hours		**12**	**4**	**16**

Semester-2

Code	Course Title	Theory	Lab	Combined
CS-112	Object Oriented Programming	3		
CSL-112	Object Oriented Programming		1	4
BS-112	Differential Equations	3	0	3
BS-103	Applied Physics	3		
BSL-103	Applied Physics		1	4
EE-113	Network Analysis	3		
EEL-113	Network Analysis		1	4
EEL-114	Computer-Aided Engineering Drawing	0	1	1
HU-102	Islamic Studies	2	0	2
Total Semester Credit Hours		**14**	**4**	**18**

Semester-3

Code	Course Title	Theory	Lab	Combined
EE-211	Basic Electronics	3		
EEL-211	Basic Electronics		1	4
EE-202	Digital Logic Design	3		
EE-202	Digital Logic Design		1	4
HU-201	Technical Report Writing	2	0	2
HU-202	Social Sciences	2	0	2
SE-201	Data Structure & Algorithms / *Basic Mechanical Engineering	2/3		
SE-201	Data Structure & Algorithms		1/0	3
BS-211	Linear Algebra	3	0	3
Total Semester Credit Hours		**15/16**	**3/2**	**18**

Semester-4

Code	Course Title	Theory	Lab	Combined
EE-213	Electronic Devices & Circuits	3		
EEL-213	Electronic Devices & Circuits		1	4
EE-214	Electrical Machines-I	3		
EEL-214	Electrical Machines-I		1	4
EE-215	Microprocessor and Interfacing Techniques	3		
EEL-215	Microprocessor and Interfacing Techniques		1	4
HU-203	Revealed Sciences	2	0	2
HU-204	Pakistan Studies	2	0	2
BS-212	Complex Variables and Transforms	3	0	3
Total Semester Credit Hours		**16**	**3**	**19**

Semester-5

Code	Course Title	Theory	Lab	Combined
EE-311	Signals and Systems	3		
EEL-311	Signals and Systems		1	4
HU-301	Islamic Ethical Principles	2	0	2
EE-313	Electromagnetic Theory	3	0	3
EE-314	Elective-I	3		
EEL-314	Elective-I		1	4
BS-311	Probability and Random Variable	3	0	3
BS-302	Numerical Methods	3	0	3
Total Semester Credit Hours		**17**	**2**	**19**

Semester-6

Code	Course Title	Theory	Lab	Combined
EE-315	Linear Control Systems	3		
EEL-315	Linear Control Systems		1	4
EE-316	Elective-II	3		
EEL-316	Elective-II		1	4
EE-317	Communication Systems	3		
EEL-317	Communication Systems		1	4
EE-318	Elective-III	3		
EEL-318	Elective-III		1	4
MS-301	Engineering Economics	2	0	2
Total Semester Credit Hours		**14**	**4**	**18**

Semester-7

Code	Course Title	Theory	Lab	Combined
EEP-401	Project Part-I	0	3	3
EE-412	Instrumentation and Measurement	3		
EEL-412	Instrumentation and Measurement		1	4
MS-401	Engineering Management	3	0	3
EE-413	Elective-IV	3		
EEL-413	Elective-IV		1	4
EE-414	Elective-V	3		
EEL-414	Elective-V		1	4
Total Semester Credit Hours		**12**	**6**	**18**

Semester-8

Code	Course Title	Theory	Lab	Combined
EEP-401	Project Part-II	0	3	3
EE-415	Elective-VI	3		
EEL-415	Elective-VI		1	4
EE-416	Elective-VII	3		
EEL-416	Elective-VII		1	4
Total Semester Credit Hours		**6**	**5**	**11**

* Offered in Faisalabad Campus only

LIST OF ELECTIVE COURSES

List of Breadth and Depth Elective Courses in Electrical Engineering (Power)

1.	Power System Analysis (Core I)
2.	Power Distribution and Utilization (Breadth Core II)
3.	Electrical Machines-II
4.	Power Generation
5.	Electrical Power Transmission
6.	Power Electronics
7.	Power System Protection
8.	Power System Operation & Control
9.	Electrical Machine Design and Maintenance
10.	High Voltage Engineering
11.	Renewable Energy Systems
12.	Digital Signal Processing
13.	Industrial Drives
14.	FACTS and HVDC Transmission
15.	Data Communication
16.	Smart Grid

List of Breadth and Depth Elective Courses in: Electrical Engineering (Communication)

1.	Computer Communication Networks (Breadth Core I)
2.	Electronic Circuit Design (Breadth Core II)
3.	Digital Communications
4.	Antennas and Wave Propagation
5.	Digital Signal Processing
6.	Transmission and Switching Systems
7.	Wireless and Mobile Communications
8.	Data Communication
9.	Satellite Communication
10.	Optical Communication
11.	RF and Microwave Engineering
12.	Navigation and Radar Systems
13.	Digital Image Processing
14.	Emerging Wireless Technologies and RF Planning
15.	Telecommunication Polices and Standards
16.	Network Security

List of Breadth and Depth Elective Courses in Electrical Engineering (Electronics)

1.	Electronic Circuit Design (Breadth Core I)
2.	Power Electronics (Breadth Core II)
3.	Integrated Electronics
4.	Microelectronics Technology
5.	Optoelectronics
6.	VLSI Design
7.	Industrial Electronics
8.	Digital System Design
9.	Introduction to Nanotechnology
10.	Digital Signal Processing
11.	Wave Propagation and Antenna
12.	Solid State Devices
13.	Digital Control Systems
14.	RF and Microwave Engineering
15.	Biomedical Instrumentation
16.	Data Communication
17.	Medical Robotics

Laboratories

Students are provided the opportunity to augment their theoretical learning through practical work in the state-of-the-art laboratories. These labs are fully equipped to carry out practical work and undertake research in the field of electronics, telecommunication, signal processing, control systems and power engineering etc. Furthermore, these labs are adaptable, reconfigurable and modular, making them ideally suited for research in the wide range of fields to understand fundamental electrical engineering concepts. Lab experiments are designed in coherence with theory. The Department of Electrical Engineering has following nine well maintained laboratories for the subject programs.

Electronics Lab: Electronics Lab I is equipped with components such as diodes, transistors, operational amplifiers, Breadboard Trainers, oscilloscope, power supplies and function generators; required to practically implement the theoretical concepts of electronic systems.

Electronics Lab II: Electronic Lab II is equipped with the power electronics trainers and logic trainers and rest is the same as Electronics Lab I. The addition of power electronics trainers help to practically perform the experiments of power electronic course.

Communication Lab: Communication systems lab helps the students to envision the theoretical communication concepts of both analog and digital communication systems. This lab consists of different analog and digital communication trainers.

Cisco Networking Academy Lab: Cisco Lab delivers information and communication technology skills to improve career and economic opportunities around the world. The Academy provides online courses, interactive tools, and lab activities to prepare individuals for information technology and networking careers in virtually every industry.

Signal Processing and interfacing Lab: Digital signal processing and very large scale integration (VLSI) lab utilizes advanced signal processing tools such as MATLAB, XILINX MICROWIND and LABVIEW to visualize various signal processing techniques including convolution, DFT, FFT, digital filters designing and IC Chip designing techniques.

Instrumentation/Control Systems Lab: Control systems lab consists of multiple workstations, each equipped with an oscilloscope, digital multi-meter, PID trainers, control system trainers. This lab also covers the industrial implementation of advanced control systems via different computer tools such as MATLAB, Simulink and real time interfacing of LABVIEW.

Machines Lab: Electrical machines lab provides the essential opportunity to the students to augment their concepts about the fundamentals of transformers and rotating machines. The lab is equipped with DC series/shunt motor, compound motor, universal motor, single-phase induction motor, single-phase transformer, three-phase induction motor, three-phase synchronous motor and three-phase transformer. The lab is equipped with various tests and monitoring equipment also.

Computing Lab: It is a dedicated lab for computer programming-oriented subjects like structured C, object oriented programming, java, computer-aided engineering drawing etc. high speed computers are installed to provide efficient computing facility for the respective courses.

Project Lab: Designed for final year projects. Students are given the separate space for implementing their final hardware projects.

MS Electrical Engineering Program

The Department of Electrical Engineering also offers Master Program in Electrical Engineering. The studies involve advanced courses in Master's degree is awarded after completion of 32 credit hours, 26 of which are coursework related and the remaining 6 credit hours are for a research thesis. In order to complete coursework, the student can take any course from the list of offered subjects in respective semester.

Eligibility Criteria

- Minimum 16 years of formal education BSc in Electrical/ Electronics/ Communication/ Computer/Mechatronics/Industrial Electronics/ Avionics Engineering with a minimum CGPA of 2.00 on a 4.00 scale or equivalent.

Degree Requirements:

- Minimum credit hours: 32 credit hours (24 Cr. Hrs**. of course work and 6 Cr. Hr. of thesis).
- The candidates are required to get a minimum CGPA of 2.5.

**Two additional Cr. Hrs of "Ethics in Practice" will be mandatory for all students as per university policy.

Duration:

Minimum 1.5 years & Maximum 4 years

Selection Criteria:

Mark in Relevant Engineering   60%
Entry Test/ Interview   40%

Interview:

The Interview will be conducted to finalize the admission to the subject discipline.

(1) Talent Scholarship for First Semester:

Marks in Previous Degree		Scholarship (%age of Tuition Fee)
%age of marks obtained (For Annual/ Percentage based system)	CGPA obtained (For Semester/CGPA based system)	
80% and above	3.90 to 4.00	100%
75% to 79.99%	3.75 to 3.89	50%
70% to 74.99%	3.50 to 3.74	25%

Criterion for Continuation of Talent Scholarship to subsequent semesters:

1. You are required to maintain CGPA between 3.85 to 4.00 to avail same percentage of scholarship as awarded in first semester.

2. Talent scholarship shall be reduced by 25% in case you secure CGPA 3.75 to 3.84.

3. Talent scholarship shall stand revoked for respective semester/term in case CGPA is below 3.75.

(2) Riphah / Industry Scholarship for First Semester:

A 25% waive-off in tuition-fee of 1st semester for the graduates of Riphah International University or the candidates already employed in the allied industry. An SGPA of 3.5 will be required to maintain the scholarship in subsequent semesters.

List of Courses

Code	Subject	Credit Hours	Elective/Core
UR-711	Ethics in Practice-I	1 + 0	Compulsory
UR-712	Ethics in Practice-II	1 + 0	Compulsory
EE-5001	Linear Systems	3 + 0	Elective
EE-5002	Stochastic Processes	3 + 0	Elective
EE-5003	Modeling and Simulation of Dynamic Systems	3 + 0	Elective
EE-5004	Basics of Inertial Navigation	3 + 0	Elective
EE-5005	Introduction to Navigation Systems	3 + 0	Elective
EE-5006	Introduction to Guidance & Control of Aerospace Systems	3 + 0	Elective
EE-5007	**Advanced Digital Signal Processing**	**3 + 0**	**Core**
EE-5008	Biomedical Signal Processing	3 + 0	Elective
EE-5009	Advanced Digital Image Processing	3 + 0	Elective
EE-5010	Video Signal Processing	3 + 0	Elective
EE-5011	Speech Processing and Coding	3 + 0	Elective
EE-5012	Wavelets and Transform Methods	3 + 0	Elective
EE-5013	Advanced Optoelectronics	3 + 0	Elective
EE-5014	ASIC for Digital Signal Processing	3 + 0	Elective
EE-5015	Advanced Microelectronics	3 + 0	Elective
EE-5016	Advanced Digital Design	3 + 0	Elective
EE-5017	Photonic Devices	3 + 0	Elective
EE-5018	Introduction to Big Data & Deep Learning in HPC	3 + 0	Elective
EE-5019	Advanced Digital Communication	3 + 0	Elective
EE-5020	Multimedia Communications	3 + 0	Elective
EE-5021	RF Circuit Theory	3 + 0	Elective
EE-5022	Secure Communications	3 + 0	Elective
EE-6001	Advanced Digital Control Systems	3 + 0	Elective
EE-6002	Embedded Control Systems	3 + 0	Elective
EE-6003	**Linear Multivariable Systems**	**3 + 0**	**Core**
EE-6004	Non-Linear Systems	3 + 0	Elective
EE-6005	Stochastic Estimation & Control	3 + 0	Elective
EE-6006	Adaptive Control	3 + 0	Elective
EE-6007	Optimal Control	3 + 0	Elective

Code	Subject	Credit Hours	Elective/Core
EE-6008	Intelligent Control	3 + 0	Elective
EE-6009	Special Topics in Control	3 + 0	Elective
EE-6010	Robust Control Systems	3 + 0	Elective
EE-6011	Integrated Navigation Systems	3 + 0	Elective
EE-6012	Computer Vision	3 + 0	Elective
EE-6013	Adaptive Signal Processing	3 + 0	Elective
EE-6014	ASIC for Digital Signal Processing	3 + 0	Elective
EE-6015	Real-Time and Multi-rate Systems	3 + 0	Elective
EE-6016	Real-Time System Design and Analysis	3 + 0	Elective
EE-6017	Neural Systems and Networks	3 + 0	Elective
EE-6018	Detection & Estimation	3 + 0	Elective
EE-6019	Artificial Intelligence Based Systems	3 + 0	Elective
EE-6020	Machine Learning	3 + 0	Elective
EE-6021	Advanced Computer Architecture	3 + 0	Elective
EE-6022	Digital System Design and Microprocessor Architecture	3 + 0	Elective
EE-6023	Multi-Core System Architecture	3 + 0	Elective
EE-6024	Programming of Multi-core Architectures	3 + 0	Elective
EE-6025	Parallel Programming Models	3 + 0	Elective
EE-6026	Advanced Semiconductor Device Physics	3 + 0	Elective
EE-6027	Special Topics in Digital Communications	3 + 0	Elective
EE-6028	Embedded Systems & Applications	3 + 0	Elective
EE-6029	Advanced Mobile & Satellite Communication	3 + 0	Elective
EE-6030	Advanced Telecommunications Networks	3 + 0	Elective
EE-6031	Advanced Computer Networks	3 + 0	Elective
EE-6032	**Advanced Antenna Theory**	**3 + 0**	**Core**
EE-6033	Engineering Operations	3 + 0	Elective
EE-6034	Microwave Filters	3 + 0	Elective
EE-6035	Advanced Microwave Engineering	3 + 0	Elective
EE-7100	Master Thesis	6	Thesis

PhD Electrical Engineering Program

The PhD Electrical Engineering program is offered as per guidelines of Higher Education Commission (HEC). The desirous candidates for PhD program must possess 18 years MS degree with a minimum CPGA of 3.00 out of 4.00. The program comprises 20 credit hours of coursework and 30 credit hours of research and doctorate dissertation. The courses can be selected in consultation with the PhD supervisor from the list of graduate courses.

The completion of coursework is followed by a comprehensive examination for granting PhD candidacy. The PhD dissertation is evaluated by two experts of technologically advanced countries and one local expert. Subsequent to positive evaluation from these experts, PhD scholar is required to undertake an open defence to fulfil the degree requirements. A minimum residency of two years at the university campus and publishing at least one research paper in an impact factor journal of good repute is also an essential requirement to earn a PhD degree.
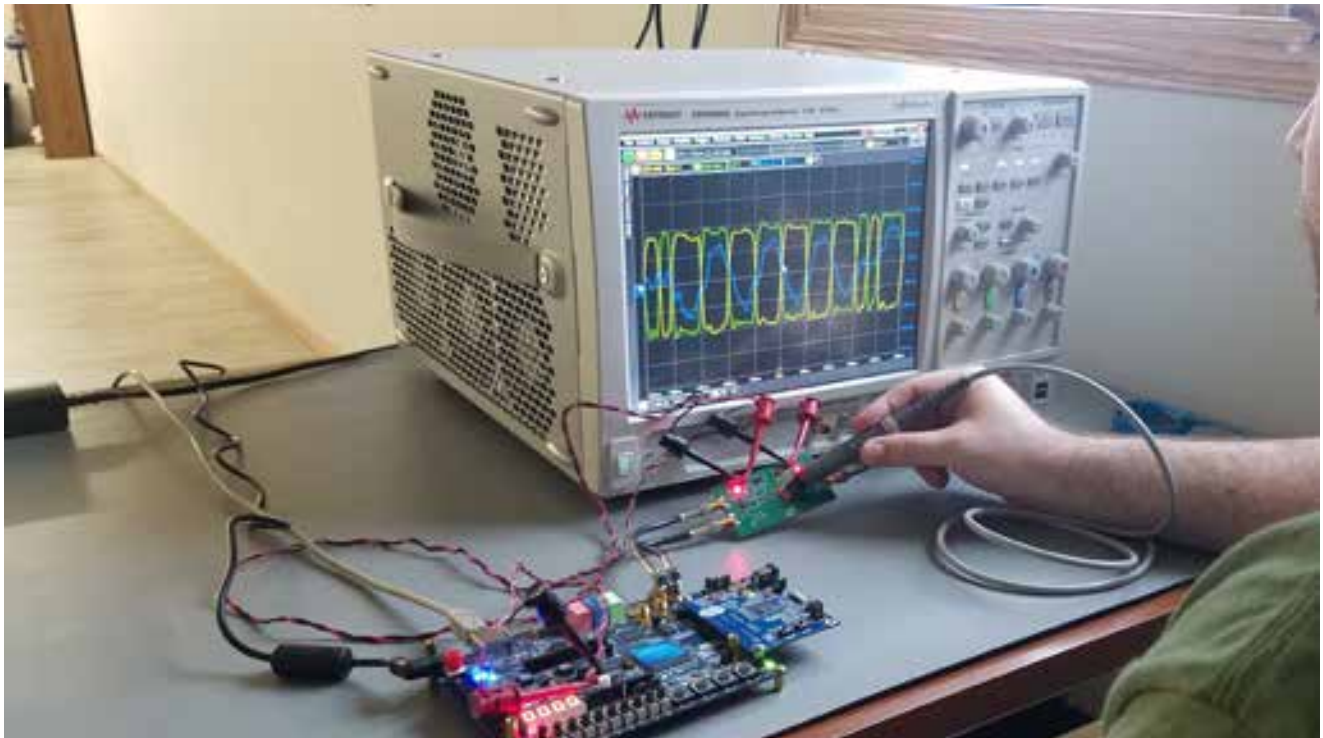
Eligibility Criteria

- Minimum 18 years of formal education MS/ MSc in Electrical/ Electronics/ Communication/ Computer/Mechatronics/Industrial Electronics/ Avionics Engineering or equivalent with a minimum CGPA of 3.00 on a 4.00 scale or equivalent.

Note: Two additional credit hours (Ethics shall be mandatory for all students as well as per university policy).

Duration:

Minimum 3 years & Maximum 8 years

Degree Requirements:

- Minimum credit hours: 20 credit hours of course work and 30 Cr. Hr. of research.
- The candidates are required to get a minimum CGPA of 3.00.

Selection Criteria:

GRE (Subject)/NTS (Subject)/FEAS Test and interview.

Interview:

The Interview will be conducted to finalize the admission to the subject discipline.

List of Courses

Code	Course Name	Cr. Hours
UR711	Ethics in Practice I	1 + 0
UR712	Ethics in Practice II	1 + 0
EE7001	Linear Systems	3 + 0
EE7002	Stochastic Processes	3 + 0
EE7003	Modeling and Simulation of Dynamic Systems	3 + 0
EE7004	Basics of Inertial Navigation	3 + 0
EE7005	Introduction to Navigation Systems	3 + 0
EE7006	Introduction to Guidance & Control of Aerospace Systems	3 + 0
EE7007	Advanced Digital Signal Processing	3 + 0
EE7008	Biomedical Signal Processing	3 + 0
EE7009	Advanced Digital Image Processing	3 + 0
EE7010	Video Signal Processing	3 + 0
EE7011	Speech Processing and Coding	3 + 0
EE7012	Wavelets and Transform Methods	3 + 0
EE7013	Advanced Optoelectronics	3 + 0
EE7014	ASIC for Digital Signal Processing	3 + 0
EE7015	Advanced Microelectronics	3 + 0
EE7016	Advanced Digital Design	3 + 0
EE7017	Photonic Devices	3 + 0
EE7018	Introduction to Big Data & Deep Learning in HPC	3 + 0
EE7019	Advanced Digital Communication	3 + 0
EE7020	Multimedia Communications	3 + 0
EE7021	RF Circuit Theory	3 + 0
EE7022	Secure Communications	3 + 0
EE8001	Advanced Digital Control Systems	3 + 0
EE8002	Embedded Control Systems	3 + 0
EE8003	Linear Multivariable Systems	3 + 0
EE8004	Non-Linear Systems	3 + 0
EE8005	Stochastic Estimation and Control	3 + 0
EE8006	Adaptive Control	3 + 0
EE8007	Optimal Control	3 + 0
EE8008	Intelligent Control	3 + 0
EE8009	Special Topics in Control	3 + 0
EE8010	Robust Control Systems	3 + 0
EE8011	Integrated Navigation Systems	3 + 0
EE8012	Computer Vision	3 + 0
EE8013	Adaptive Signal Processing	3 + 0
EE8014	ASIC for Digital Signal Processing	3 + 0

Code	Course Name	Cr. Hours
EE8015	Real-Time and Multi-rate Systems	3 + 0
EE8016	Real-Time System Design and Analysis	3 + 0
EE8017	Neural Systems and Networks	3 + 0
EE8018	Detection & Estimation	3 + 0
EE8019	Artificial Intelligence Based Systems	3 + 0
EE8020	Machine Learning	3 + 0
EE8021	Advanced Computer Architecture	3 + 0
EE8022	Digital System Design & Microprocessor Architecture	3 + 0
EE8023	Multi-Core System Architecture	3 + 0
EE8024	Programming of Multi-core Architectures	3 + 0
EE8025	Parallel Programming Models	3 + 0
EE8026	Advanced Semiconductor Device Physics	3 + 0
EE8027	Special Topics in Digital Communications	3 + 0
EE8028	Embedded Systems & Applications	3 + 0
EE8029	Advanced Mobile & Satellite Communication	3 + 0
EE8030	Advanced Telecommunications Networks	3 + 0
EE8031	Advanced Computer Networks	3 + 0
EE8032	Advanced Antenna Theory	3 + 0
EE8033	Engineering Operations	3 + 0
EE8034	Microwave Filters	3 + 0
EE8035	Advanced Microwave Engineering	3 + 0
EE8100	PhD Thesis	30

Note: Two additional credit hours (Ethics shall be mandatory for all students as well).

RESEARCH GROUPS (ELECTRICAL ENGINEERING)

ADVANCED COMPUTING IN FUTURE TECHNOLOGY (ACFT)

Team Lead: Prof. Dr. Jameel Ahmed

Members: Dr. Shaheryar Najam, Arslan Shafique, Asif Siddiq, Shahzad Iqbal, Muhammad Shahbaz Khan, Menaa Nawaz, Fadia Ali Khan, Muhammad Owais Tariq

Working: This research group is aimed at bringing in future technologies. Current research involves power efficient high performance computing, Big data analytics, traffic engineering in data Center networks, millimeter wave 5G reconfigurable MIMO antenna array design, amplification of MEMS based micro-gripper and advanced encryption/decryption schemes for data security.

RADIO FREQUENCY RESEARCH GROUP (RFRG)

Team Lead: Dr. Sohail Khalid

Members: Muhammd Faisal, Bilal Mushtaq, Abdul Rehman, Muhammad Idrees, Mujeeb ur Rehman.

Working: RF research group in the Electrical Engineering department is working on the synthesis and design of various microwave devices. Our recent research project work is on the synthesis and design of reconfigurable multiband bandpass RF filters and substrate integrated waveguides. Moreover, we are also working on designing a novel multilayer microstrip patch antenna for producing a dual-band dual-mode frequency response.

COMPUTER AND INFORMATION SCIENCE (CIS)

Team Lead: Dr. Shaheryar Najam

Members: Mujeeb Ur Rehman, Arslan Shafique, Tahseen Ahsan

Working: Computer and Information Science (CIS) is a research group that aims at advanced technologies to automate the processes such as automatic security systems and non-invasive disease diagnosis using artificial intelligence. Moreover, CIS's research scope also includes green computing, power-efficient computing architectures, and high-performance computing. Currently, on gong projects aims at early diagnosis of chronic disease linked with vital body organs such as liver, lung, and kidney using the science of iridology, forecasting the spread of COVID-19 using machine learning, and securing sensitive information such as medical and military-related images that requires the highest level of confidentiality particularly during transmission and storage.

CONTROL SYSTEM & POWER ELECTRONICS RESEARCH GROUP (CSPERG)

Team Lead: Dr. Haris Shehzad

Members: Adil Zohaib , Tabish Fawad, Muhammad Farrukh Qureshi

Working: Control Research group at Electrical Engineering Department is working on the design and implementation of advanced adaptive control algorithms for the control of Converters, Inverters, Bearing-less Motors, Permanent magnet synchronous motors and Brushless DC motors. The designed adaptive controllers are implemented in real time on the hardware in order to compare its performance with the state of the art controllers. Also, the group is working on modern power system control and smart power systems.

PhD Alumni, Electrical Engineering Deartment

S.No	Alumnus Name	Degree Title	CGPA Obtained	Year	PhD Supervisor	Research Articals Published for PhD Degree	Current Position of Alumni
1	Dr. Sadat Hanif Dar	PhD Electrical Engineering	3.30/4.00	2018	Prof. Dr Jameel Ahmed	(1) "Performance Analysis of Wearable Patch Antenna on Flannel Substrate." Journal of Biobased Materials and Bioenergy 11, no. 5 (2017): 424-432. (2) "Characterizations of flexible wearable antenna based on rubber substrate. "Int. J. Adv. Comput. Sci. Appl 7 (2016): 190-5 (3) "Wearable textile antenna design in body centric wireless communications: "A systematic literature review." (2017)	Registrar, Mirpur University of Science & Technology (MUST)
2.	Dr. Shaheryar Najam	PhD Electrical Engineering	4.40/4.00	2021	Prof. Dr Jameel Ahmed	(1) "Run-time resource management controller for power efficiency of GP-GPU architecture." IEEE Access 7 (2019): 25493-25505 (2) "Run-time neuro-fuzzy type-2 controller for power optimisation of GP-GPU architecture." IET Circuits, Devices & Systems 14, no. 8 (2020): 1253-1257 (3) "Real-Time Implementation of Fuzzy Logic Based DVFS For Leon3 Architecture." Asian Journal of engineering, sciences & technology 8, no. 1 (2018). (4)"A fuzzy logic based power-efficient run-time reconfigurable multicore system."Chinese Journal of Electronics 27, no. 3 (2018): 549-555.	Senior Lecturer, Riphah International University, Islamabad

Funded Research-Projects, Electrical Engineering Department (2018-2020)

S.No	Title of Funded Project	Funding Body	Principal Investigator (P.I)	Funding Amount of Project (PKR)	Completion Status
1	Development Of A Scalable Heterogeneous Supercomputer	HEC, Pakistan	Dr. Tassadaq Hussain	14 Million	Completed
2	Identification of the human health-problems by using eye-iris, iridology map	HEC, Pakistan	Dr. Tassadaq Hussain	2.4 Million	Completed
3	Development Of Hardware Based Gel Documentation System For DNA, RNA And Proteins Analysis	HEC, Pakistan	Dr. Tassadaq Hussain	14 Million	Completed
4	Spanish government BSC-CNS Severo Ochoa program	Spanish Ministry	Dr. Tassadaq Hussain	10 Thousands Euro	Completed
5	Performance And Power Aware GPUs For High End Computing	RARE/ORIC-Riphah	Dr. Jameel Ahmed	0.15 Million	Completed
6	Run time DVFS framework for power optimization of heterogeneous computing architecture	RARE/ORIC-Riphah	Dr. Jameel Ahmed	0.15 Million	Completed
7	Artificial intelligence based resources management controller for power optimized GP-GPU Architecture	RARE/ORIC-Riphah	Dr. Jameel Ahmed	0.15 Million	Completed
8	Heterogenous multi-core software defined radio system	RARE/ORIC-Riphah	Dr. Tassadaq Hussain	0.15 Million	Completed
9	Design, Analysis and adaptive control of high level-power converter	RARE/ORIC-Riphah	Dr. Haris Shehzad	0.15 Million	Completed

Funded Final-Year-Projects (FYPs), Electrical Engineering Department (2019-2020)

S.No	Title of Funded FYP	Funding Body	Project Supervisor	Funding Amount of Project (PKR)	Year	Completion Status
1	A non invasive system for pre diagnosing of human digestive disorders	Ignite/NGIRI	Dr Tassadaq Hussain S	0.074 Million	2,020	Completed
2	Solar powered smart Irrigation system	Ignite/NGIRI	Engr. Muhammad Sadiq Orakzai	0.067 Million	2,020	Completed
3	Synthesis and design of Reconfigurable microstrip filter	Ignite/NGIRI	Engr. Muhammad Faisal	0.08 Million	2,020	Completed
4	Development of Robot arm prosthetic with feedback control system	Ignite/NGIRI	Dr Haris Shehzad	0.072 Million	2,020	Completed
5	Car Automation	Ignite/NGIRI	Engr Muhammad Faisal Sheikh	0.028 Million	2,020	Completed
6	Hybrid Power Generation	Ignite/NGIRI	Engr. Muhammad Sadiq Orakzai	0.06 Million	2,019	Completed
7	Iris Based Lungs Disorder Diagnosis System	Ignite/NGIRI	Dr Tassadaq Hussain S	0.078 Million	2,019	Completed
8	A Flexible and Programmable Digital Radio Mondiale	Ignite/NGIRI	Dr Tassadaq Hussain S	0.071 Million	2,019	Completed
9	Monitoring and Controlling Of A 3-Phase Single Bus Bar System Using Plc And Hmi	Ignite/NGIRI	Engr. Saqib Amin	0.072 Million	2,019	Completed
10	Run Time Implementation Of Self-Mixing Laser Interferometric Sensor For Vibration Measurement	Ignite/NGIRI	Engr. Saqib Amin	0.025 Million	2,019	Completed

Impact Factor Publications, January 2020-March 2021 (Electrical Engineering Department)

S.No	Name of Riphah's Authors	Publication Title	Journal Name	ISSN	Category	Impact Factor	Vol. (Issue No)	Pg No.
1	Arslan Shafique	Survey of Security Protocols & Vulnerabilities in Unmanned Aerial Vehicles	IEEE Access	2169-3536	W	3.745	9	46927 - 46948
2	Arslan Shafique, Jameel Ahmed and Mujeeb Ur Rehman	Detecting the Security Level of Various Cryptosystems Using Machine Learning Models	IEEE Access	2169-3536	W	3.745	9	9383 - 9393
3	Arslan Shafique, Jameel Ahmed and Mujeeb Ur Rehman	Noise-Resistant Image Encryption Scheme for Medical Images in the Chaos and Wavelet Domain	IEEE Access	2169-3536	W	3.745	9	59108 - 59130
4	Arslan Shafique and Jameel Ahmed	Dynamic substitution based encryption algorithm for highly correlated data	Multidimentional systems and Signal Processing	1573-0824	X	1.81	32	91-114
5	Arslan Shafique	Image Encryption Using Dynamic S-Box Substitution in the Wavelet Domain	Wireless Personal Communications	1572-834X	X	1.061	115	2243-2268
6	Arslan Shafique, Mujeeb Ur Rehman, and Sohail Khalid	Dynamic Substitution and Confusion- Diffusion- Based Noise- Resistive Image Encryption Using Multiple Chaotic Maps	IEEE Access	2169-3536	W	3.745	9	52277 - 52291
7	Sohail Abbas	NIR self-powered photodetection and gate tunable rectifcation behavior in 2D GeSe/MoSe2 heterojunction diode	Scientific Report (Nature Journal)	2045-2322	W	3.998	11	3688
8	Muhammad Jamshed Abbas, Sohail khalid, Muhammad AbdulRehman	The extended model predictive-sliding mode control of three-level AC/DC power converters with output voltage and load resistance variations	Systems Science & Control Engineering	2164-2583	X	1.97	9	127–137
9	Sohail Khalid	Polarization insensitive pentabandstop frequency selective surface for closely placed bands	Microwave & Optical Technology Letters	1098-2760	W	0.957	63	271-278
10	Zohaib A Khan, Tassadaq Hussain	Adaptive Estimation and Reduction of Noises Affecting a Self-Mixing Interferometric Laser Sensor	IEEE Sensors	1530-437X	W	3.076	20	-
11	Muhammad Faisal, Sohail khalid, Mujeeb ur Rehman, Muhammad Abdul Rehman	Synthesis and Design of Highly Selective Multi-Mode Dual-Band Bandstop Filter	IEEE Access	2169-3536	W	3.745	9	43316 - 43323
12	Haris Sheh Zad	Cloud Based IoT Solution for Fault Detection and Localization in Power Distribution Systems	Energies	1996-1073	W	2.7	13	2686
13	Haris Sheh Zad	Multi-Stressed Nano and Micro-Silica/Silicone Rubber Composites with Improved Dielectric and High-Voltage Insulation Properties	Polymers	2073-4360	W	3.43	13	1400
14	Shaheryar Najam, Jameel Ahmed	Run-time neuro-fuzzy type-2 controller for power optimisation of GP-GPU architecture	IET Circuits, Devices & Systems	1751-858X	X	1.49	14(8)	1253-1257
15	Muhammad Akmal	Classification analysis of Tensor-Based Recovered Missing EEG Data	IEEE Access	2169-3536	W	3.745	9	41745-41756
16	Faisal Saleem	Application and Comparison of Kernel Functions for Linear Parameter Varying Model Approximation of Nonlinear Systems	Applied Mathematics - A Journal of Chinese Universities Series B (Springer)	1005-1031	X	0.86	-	-
17	Saqib Amin, Tasadaq Hussain	High resolution laser self-mixing displacement sensor under large variation in optical feedback and speckle	IEEE Sensors	1530-437X	W	3.076	20(16)	9140 - 9147
18	Tasadaq Hussain, Saqib Amin	Implementation of a high-accuracy phase unwrapping algorithm using parallel-hybrid programming approach for displacement sensing using self-mixing interferometry	The Journal of Supercomputing	1573-0484	W	2.469	-	-

Alumni Comments

Yasir Basheer

Batch: 2016-BSc Electrical Engineering

About Riphah:

"Choosing Riphah for Electrical Engineering was easily one of the best decisions I've ever made. Riphah doesn't just give you a degree, they prepare you to use everything you learn in your future.The environment between professors and students here is a special one, as the professors would always go out of their way to help students that were eager to learn. The challenging curriculum and helpful nature of the professors went a long way to making sure I was more than prepared to apply my skills towards my career."

Rabia Nawaz

Batch: 2016-BSc Electrical Engineering

About Riphah:

"Asalam u Alaikum, I'm Rabia Nawaz and I have done my Bachelor's in Electrical engineering from Riphah International university Islamabad. University is the second home for Students, and it plays a vital role in nurturing them into good human beings. Besides shaping the character of a student, the university helps him to face the world with bravery and courage. The teachers and the students share an intimate and intricate bond of love and respect. I, as an Alumni of Riphah want to say that, my experience in Riphah was tremendous!

I've really enjoyed my Four years of educational journey at Riphah with Great and supportive faculty. Teachers have been really kind and they helped us in every problem we faced, in our studies as well as in our character building. I'm Very Grateful to all my teachers for making me a better person. As, i'm inspired from the way of teaching at Riphah, I'm pursuing my Masters in Electrical engineering from Riphah International university Islamabad."

Muhammad Rian

Batch: 2016-BSc Electrical Engineering

About Riphah:

During 4 Years time span at Riphah,lot of memorable things related to academics and learning happened to me. First and foremost thing is Riphah has enrich faculty, which has proved to be very cooperative for students in every aspect apart from academics. Second most important thing I liked the very most about Riphah during my time was proper career counselling and monitoring sessions. These sort of activities has helped me alot to groom myself for professional career. Riphah has advanced labs consisting of efficient equipments which help students for better practical understanding. So far, it's been previliged to get enroll in Riphah International University.

Salamat Ali

Batch: 2016-BSc Electrical Engineering

About Riphah:

"Being Alumni, I have experienced that Riphah International University provides good scholarship opportunities to Talented and as well as to deserving students. There is no barrier between faculty and students, whenever we need them, they were there to teach & guide us. One thing I have experienced is that they provide a good environment to learn & provide chances to interact with industry by arranging industrial visits "
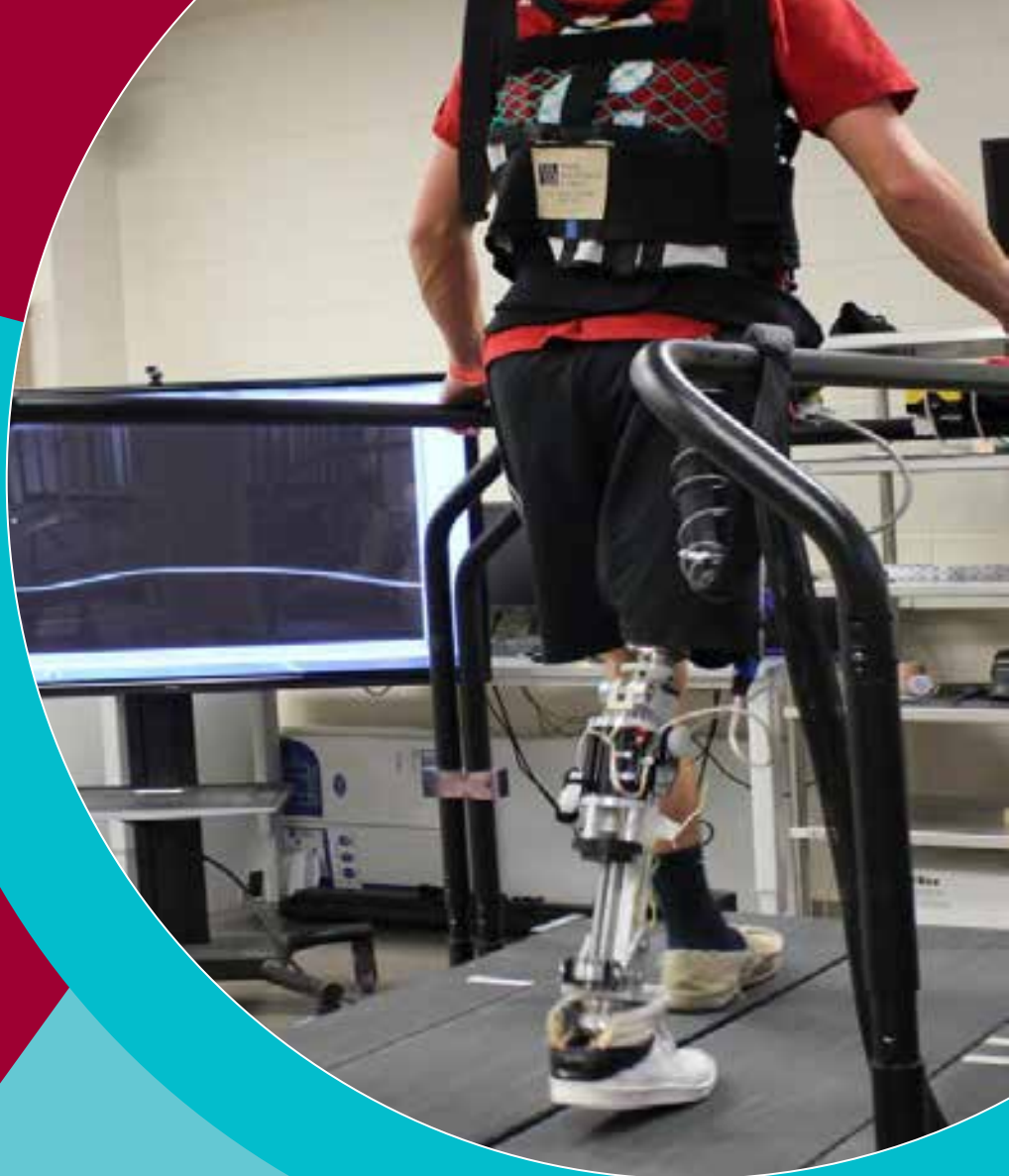
Department of
Biomedical Engineering

Faculty of Biomedical Engineering Department

Department of
BIOMEDICAL ENGINEERING

Welcome to the exciting field of Biomedical Engineering which is broadly defined as the application of Engineering in the field of medicine and surgery. It has planted its feet concretely and helped the medical healthcare system made advancements since 1900s. Biomedical engineering has brought together the knowledge of diverse fields with a focus of applications in medical sciences. It abetted the healthcare professionals from looking inside the patient's body to rehabilitate the paralyzed ones.

The Department of Biomedical Engineering is among the pioneers for introducing BSc Biomedical Engineering program in 1998. Since then, the department of Biomedical engineering has produced qualified graduates who are not only working in the country's leading organizations but also earned name for the country by contributing in the relevant fields exceptionally well in foreign countries. The department also offers MS and PhD Biomedical Engineering programs. Currently there are many graduate students who are working with the BME research groups.

The future of Biomedical Engineering is very bright. The exponential increase in population will need more hospitals and enhancement of existing healthcare facilities. Consequently, we will need Biomedical Engineers to work in hospitals to manage and maintain Biomedical equipment. Many more Biomedical professionals would be in demand to design and develop smart instruments. Companies would be requiring engineers to introduce their instruments to the end users in order to compete with other manufacturers. Universities would need to recruit experts to offer Biomedical engineering programs and meet the market demand by producing more Biomedical engineers.

Biomedical engineering is the field to choose not only to secure your future but to serve mankind by contributing in providing the best possible healthcare facilities.

At Riphah, we ensure that our graduates receive all the required knowledge and skills which could assist them to face the future challenges with zeal and confidence.

Dr. Muhammad Shafique
Professor, HOD

Faculty of
BIOMEDICAL ENGINEERING DEPARTMENT

Dr. Muhammad Shafique
Designation:	Professor & HOD
Qualification:	Post Doc. City University London, United Kingdom
	PhD Biomedical Engineering, City University London, United Kingdom
Area of Interest:	Physiological Measurements, Instrumentation, Signal Processing, Sensors, Optoelectronics
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Contact:	faraz.akram@riphah.edu.pk, +92 (51) 844600 Ext: 297

Dr. Zia ur Rehman
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Qualification:	Ph.D Robotics and Intelligent Machine learning, NUST University Islamabad, Pakistan
Area of Interest:	Myoelectric Control, Biomedical Signals and Image processing
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Engr. Faisal Amin
Designation:	Senior Lecturer
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Area of Interest:	Biomaterials/Prostheses, Biomedical Instrumentation, Rehabilitation Engineering
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	+92 (51) 844600 Ext: 261

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Engr. Sarah Hussain
Designation: Lecturer
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Dr. Sara Rehman
Designation: Lecturer
Qualification: Bachelor of Medicine, Bachelor of Surgery
Area of Interest: Biomedical Instrumentations
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Engr. Abdul Malik Muhammad
Designation: Lecturer
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Area of Interest: Image processing and Biomedical Instrumentation.
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Engr. Hamza Toor
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Engr. Seemab Zakir
Designation: Lab Engineer
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Engr. Maria Tahir
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Engr. Shehzaib Shafique
Designation: Lab Engineer
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Contact: Shehzaib.shafique@riphah.edu.pk

Engr. Bareera Amjad
Designation: Lab Engineer
Qualification: B.Sc. Biomedical Engineering, Riphah international university.
Area of Interest: Artificial Intelligence and Programming
Contact: Bareera.amjad@riphah.edu.pk, +92(51)844600 Ext: 274

Coordination Office

Anjum Iqbal Khattak
Assitant Manager Academics
E-mail: anjum.iqbal@riphah.edu.pk
Cell: +92 (321) 5757648

BSc Biomedical Engineering Program

Biomedical engineering applies the principles of engineering and design concepts to medicine and biology with the intention of improving the overall healthcare of society. The complex medical technologies is used in the prognosis, diagnosis, monitoring and treatment of the sick and injured. With a 10 year job growth of 72% the area is growing exponentially and the demand for biomedical engineers is increasing rapidly.

Biomedical engineers are employed in the industry, in hospitals, in research facilities of educational and medical institutions, in teaching, and in government regulatory agencies. They often serve a coordinating or interfacing function, using their background in both engineering and medical fields. In industry, they may create designs where an in-depth understanding of living systems and of technology is essential.

The program spans over four years (eight semesters) and comprises 138 credit hours. The semester-wise breakup of curriculum is given on subsequent pages.
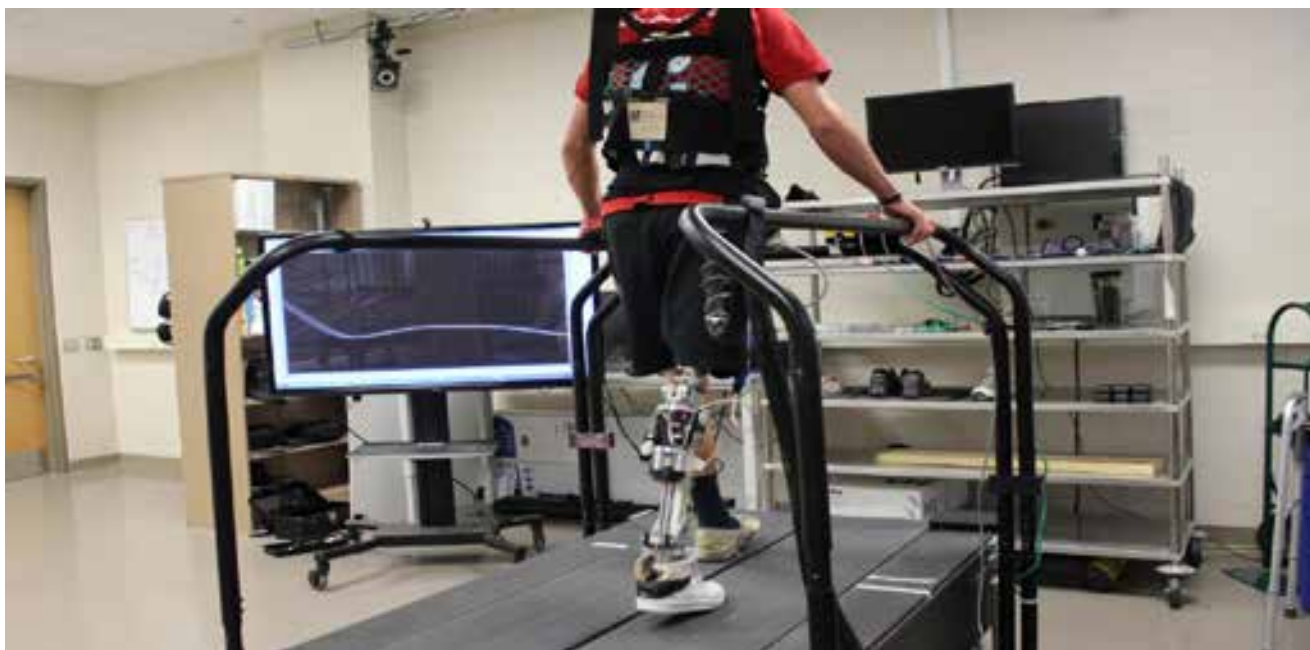
Eligibility Criteria:

F.Sc. Pre Engineering or Pre Medical minimum 60% marks

OR

"A" levels equivalent to F.Sc. Pre Engineering/ Pre Medical minimum 60% marks

OR

DAE in Biomedical minimum 60% marks (Limited Seats)

Duration:

4 years (8 semesters)

Internships:

Internship is requirement of degree

Class Timings:

8:00 am to 4:00 pm

Selection Criteria:

Candidates are required to take Riphah's entry test.
F.Sc.   70%
Entry Test/ Interview   30%

Interview:

An interview will be conducted for finalizing the admission to the subject discipline.

Talent Scholarships for for 1st Semester Biomedical Engineering

% age of marks Obtained in Intermediate (Annual/Percentage based system)	Scholarship (% age of Tuition Fee)
80% and above	100%
75% to 79.99%	50%
70% to 74.99%	25%

Semester I

Code	Course Title	Theory	Lab	Combined
BS-101	Applied Physics	2	-	-
BSL-101	Applied Physics	-	1	3
CS-101	Introduction to Computing	2		
CSL-101	Introduction to Computing		1	3
EE-101	Basic Electrical Engineering	3	-	-
EEL-101	Basic Electrical Engineering		1	4
BS-102	Basic Mathematics	4	0	4
BS-103	Basic Biology	4	0	4
BM-101	Introduction to Biomedical Engineering	1	0	1
HU-101	Pakistan Studies	2	0	2
Total Semester Credit Hours		**14**	**3**	**17**

Semester II

Code	Course Title	Theory	Lab	Combined
HU-102	Islamic Studies	2	0	2
BS-114	Calculus & Analytical Geometry	3	0	3
BM-112	Physiology I	2	-	-
BML-112	Physiology I		1	3
EE-112	Circuit Analysis	3		
EEL-112	Circuit Analysis	-	1	4
CS-112	Object Oriented Programming	2	-	-
CSL-112	Object Oriented Programming	-	1	3
BM-113	Human Anatomy	2		
BML-113	Human Anatomy		1	3
Total Semester Credit Hours		**14**	**4**	**18**

Semester III

Code	Course Title	Theory	Lab	Combined
BS-211	Complex Variable & Transformation	3	0	3
BM-211	Physiology II	2	-	-
BML-211	Physiology II	-	1	3
BM-202	Biochemistry	2	-	-
BML-202	Biochemistry	-	1	3
EE-211	Basic Electronics	3	-	-
EEL-211	Basic Electronics	-	1	4
CSL-201	Computer Aided Engineering Drawing	0	1	1
HU-201	Communication Skills	2	0	2
Total Semester Credit Hours		**12**	**4**	**16**

Semester IV

Code	Course Title	Theory	Lab	Combined
BM-213	Biomedical Electronics	3	-	-
BML-213	Biomedical Electronics	-	1	4
EE-212	Digital Logic Design	3	-	-
EEL-212	Digital Logic Design	-	1	4
BS-212	Linear Algebra & Differential Equation	3	0	3
BM-214	Biomechanics	3	-	-
BML-214	Biomechanics	-	1	4
EE-213	Signals & Systems	3	-	-
EEL-213	Signals & Systems	-	1	4
Total Semester Credit Hours		**15**	**4**	**19**

Semester V

Code	Course Title	Theory	Lab	Combined
BM-311	Biomedical Instrumentation 1	3	-	-
BML-311	Biomedical Instrumentation 1	-	1	4
BS-311	Probability & Statistics	3	0	3
BS-312	Numerical Methods	3	0	3
EE-311	Microprocessor & Interfacing	2	-	-
EEL-311	Microprocessor & Interfacing	-	1	3
BM-312	Biomedical Signal Processing	3	-	-
BML-312	Biomedical Signal Processing	-	1	4
Total Semester Credit Hours		**14**	**3**	**17**

Semester VI

Code	Course Title	Theory	Lab	Combined
BM-313	Biomedical Instrumentation II	3	-	-
BML-313	Biomedical Instrumentation II	-	1	4
BM-XXX	Elective I	3	0	3
BM-314	Biomedical Control Systems	3	-	-
BML-314	Biomedical Control Systems	-	1	4
CS-311	Modelling & Simulation	2	-	-
CSL-311	Modelling & Simulation		1	3
BM-315	Biomaterials	3		
BML-315	Biomaterials	-	1	4
Total Semester Credit Hours		**14**	**4**	**18**

Semester VII

Code	Course Title	Theory	Lab	Combined
MS-401	Engineering Management	3	0	3
BM-411	Medical Imaging	2		
BML-411	Medical Imaging		1	3
BM-XXX	Elective II	3	0	3
BM-XXX	Elective III	3	0	3
HU-401	Technical Report Writing	3	0	3
BMP-402	Biomedical Engineeirng Project (Phase I)	0	3	3
Total Semester Credit Hours		**14**	**4**	**18**

Semester VIII

Code	Course Title	Theory	Lab	Combined
BM-XXX	Elective IV	3	0	3
HU-402	Professional Practices & Ethics	3	0	3
BM-XXX	Elective V	3	0	3
BMP-402	Biomedical Engineeirng Project (Phase II)	0	3	3
MS-402	Entrepreneurship	3	0	3
Total Semester Credit Hours		**12**	**3**	**15**
Total Credit Hours		**109**	**29**	**138**

List of Elective Courses

The following may be offered as elective specialization courses according to the availability of resources.

Track 1
Biomedical Instrumentation

Course Title
Biomedical Engineering Systems
Medical Device Quality System and Standards
Medical Device Regulatory Affairs
Power Electronics
Medical Robotics
Bioelectricity
Circulatory Control in Biomedical Engineering
Rehabilitation Engineering

Track 2
Tissue Engineering and Molecular Bioengineering

Course Title
Biophysics
Cell & Molecular Biology
Fluid Mechanics & Heat Transfer
Tissue Engineering
Genetic Engineering
Nano Biotechnology
DNA Computing
Regenerative Medicine
Drug Delivery Systems

Track 3
Biomedical computing

Course Title
Telemedicine
Medical Data System
Computational Fluid Dynamics
Artificial Intelligence
Bioinformatics
Medical Image Processing
Hospital Information System

Laboratories

Following are the nine labs dedicated for biomedical engineering program.

Biochemistry / Biomaterial / Biofluids Lab:

This lab is dedicated for biomedical engineering for various experiments related to biochemistry, biomaterials and biofluids. Latest training modules are available to conduct the experiments as per PEC recommendation.

Physiology & Anatomy / Bio-modeling and Simulation Lab:

In this lab the students conduct practicals related to the physiology and anatomy/bio-modeling and simulation. Training modules of Biopac, power lab and KL700 are available in the lab for specific experiments.

Bio Instrumentation / Biophysics Lab:

This lab covers the instrumentation and biophysics courses outline. Fully equipped Work Benches along with instrumentation trainer, Bio-PAC System, qube Servo trainer are available in the lab.

Biomedical Electronics Lab:

Electronics Lab is equipped with components such as diodes, transistors, operational amplifiers,

oscilloscope, power supplies and function generators; required to practically implement the theoretical concepts of electronic systems.

Signal Processing and Interfacing Lab:

Digital signal processing and very large scale integration lab utilizes advanced signal processing tools such as MATLAB, Xilinx and LAB VIEW to visualize various signal processing techniques including convolution, DFT, FFT and digital filters designing techniques. DSP kits TMS 320C6713 DSK are also provided for advanced stage practical implementations.

Bio Instrumentation/Control Systems Lab:

Control systems lab consists of multiple workstations, each equipped with an oscilloscope, digital multi-meter, PID trainers, control system trainers. This lab also covers the industrial implementation of advanced control systems via different computer tools such as MATLAB and Simulink.

Computing Lab:

It is a dedicated lab for computer programming-oriented subjects like structured C, object oriented programming, java, computer-aided engineering drawing etc. high speed computers are installed to provide efficient computing facility for the respective courses.
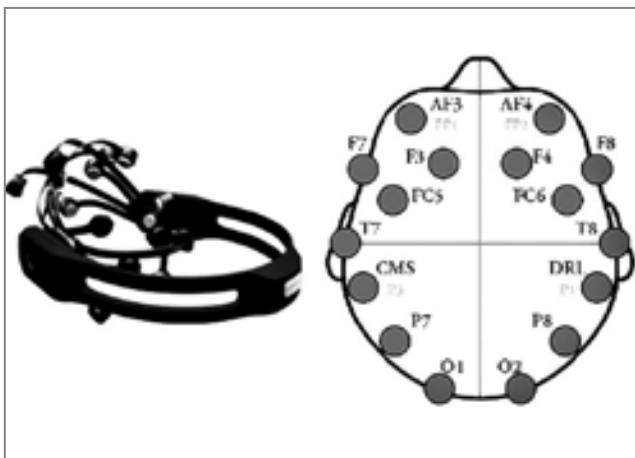
MS Biomedical Engineering Program

Department of Biomedical Engineering (BME), Faculty of Engineering & Applied Sciences (FEAS), offers Master of Science in biomedical specialization like Biomedical Instrumentation, Biomedical Signal Processing and Biomaterials. Master's degree is awarded after completion of 32 credit hours, 26 of which are coursework related and the remaining 6 credit hours are for a research thesis. In order to complete coursework, the student can take any from the list of offered subjects in respective semester.

Eligibility Criteria

- Minimum 16 years of formal education BSc in Biomedical/ Materials/ Electrical/ Electronics/ Communication/Computer/Mechatronics/ Mechanical/ Industrial Electronics/ Chemical Engineering or equivalent with a minimum CGPA of 2.00 on a 4.00 scale or equivalent.

Note: The students having their previous degree in **Mechanical Engineering, Chemical Engineering, Material engineering, Computer Engineering and Software Engineering** will be required to take two additional courses in their 1st semester:

Degree Requirements:

- Minimum credit hours: 32 credit hours (26 Cr. Hr. of course work and 6 Cr. Hr. of thesis).
- The candidates are required to get a CGPA of 2.5.

Duration:

Minimum 1.5 years & Maximum 4 years

Selection Criteria:

Marks in Relevant Engineering Program 60%
Entry Test/ Interview   40%

Interview:

The Interview will be conducted to finalize the admission to the subject discipline.

(1) Talent Scholarship for First Semester:

Marks in Previous Degree		Scholarship (%age of Tuition Fee)
%age of marks obtained (For Annual/ Percentage based system)	CGPA obtained (For Semester/CGPA based system)	
80% and above	3.90 to 4.00	100%
75% to 79.99%	3.75 to 3.89	50%
70% to 74.99%	3.50 to 3.74	25%

Criterion for Continuation of Talent Scholarship to subsequent semesters:

1. You are required to maintain CGPA between 3.85 to 4.00 to avail same percentage of scholarship as awarded in first semester.

2. Talent scholarship shall be reduced by 25% in case you secure CGPA 3.75 to 3.84.

3. Talent scholarship shall stand revoked for respective semester/term in case CGPA is below 3.75.

(2) Riphah / Industry Scholarship for First Semester:

A 25% waive-off in tuition-fee of 1st semester for the graduates of Riphah International University or the candidates already employed in the allied industry. An SGPA of 3.5 will be required to maintain the scholarship in subsequent semesters.

MS Biomedical Engineering Curriculum

List of Courses

Code	Subject	Cr. Hrs	Elective/Core
UR711	Ethics in Practice I	1 + 0	Compulsory
UR712	Ethics in Practice II	1 + 0	Compulsory
BM5001	Biology for Engineers* (Non Credit Course)	3 + 0	Elective
BM5002	Applied Mathematics & Basic Electronics** (Non Credit Course)	3 + 0	Elective
BM5011	**Systems Physiology**	**3 + 0**	**Core**
BM5012	Cell and Molecular Biology	3 + 0	Elective
BM5013	Molecular Biology	3 + 0	Elective
BM5021	Biomedical Signal Processing *	3 + 0	Elective
BM5022	Advanced Biomedical Signal Processing	3 + 0	Elective
BM5023	Biomedical Signals & Systems *	3 + 0	Elective
BM5024	Advanced Biomedical Signals & Systems	3 + 0	Elective
BM5025	Advanced Biomedical Image Processing	3 + 0	Elective
BM5026	Brain Computer Interface	3 + 0	Elective
BM5027	Human Computer Interaction	3 + 0	Elective
BM5031	**Advanced Biomedical Instrumentation**	**3 + 0**	**Core**
BM5032	Biomedical Engineering Systems	3 + 0	Elective
BM5033	Ultrasonic Instrumentation and Imaging	3 + 0	Elective
BM5034	Real Time Systems Design& Applications	3 + 0	Elective
BM5035	Advanced Medical Imaging	3 + 0	Elective
BM5036	Advanced Biomedical Control Systems	3 + 0	Elective
BM5037	Selected Topics in Biomedical Engineering	3 + 0	Elective
BM5038	**Biomedical Sensors**	**3 + 0**	**Core**
BM5039	Medical Microsystems	3 + 0	Elective
BM5040	Advanced Rehabilitation Engineering	3 + 0	Elective
BM5041	Advanced Biomedical Robotics	3 + 0	Elective
BM5042	Biomedical Microprocessor and Interfacing	3 + 0	Elective
BM5043	Embedded Systems & Applications	3 + 0	Elective
BM5044	Advanced Digital Design	3 + 0	Elective
BM5045	Biomedical Devices Design	3 + 0	Elective

Code	Subject	Cr. Hrs	Elective/Core
BM5046	Modeling & Simulation of Physiological Systems	3 + 0	Elective
BM5047	Biomedical Optics and Lasers	3 + 0	Elective
BM6061	Biostatistics	3 + 0	Elective
BM6062	Machine Learning	3 + 0	Elective
BM6063	Pattern Recognition	3 + 0	Elective
BM6064	Neuralengineering	3 + 0	Elective
BM6071	Biomaterial Science & Engineering	3 + 0	Elective
BM6072	Advanced Biomaterials	3 + 0	Elective
BM6073	Biomaterials and Drug Delivery	3 + 0	Elective
BM6074	Advances in Tissue Engineering	3 + 0	Elective
BM6075	Nano Biotechnologies	3 + 0	Elective
BM6076	Advanced Techniques in Biotechnology	3 + 0	Elective
BM6077	Biomechanics *	3 + 0	Elective
BM6078	Advanced Biomechanics	3 + 0	Elective
BM6079	Advanced Biofluid Mechanics	3 + 0	Elective
BM6081	Operations Management	3 + 0	Elective
BM7099	Research Methodology	1 + 0	Elective
BM7100	Master Thesis	6	Compulsory

* For those students who have not studied these or relevant courses in their previous degrees and wish to take advanced courses.

Note: Two additional credit hours (Ethics shall be mandatory for all students as well).

PhD Biomedical Engineering Program

The PhD Biomedical Engineering program is offered as per guidelines of Higher Education Commission (HEC). The desirous candidates for PhD program must possess 18 years MS degree with a minimum CPGA of 3.00 out of 4.00. The program comprises 20 credit hours of coursework and 30 credit hours of research and doctorate dissertation. The courses can be selected in consultation with the PhD supervisor from the list of graduate courses.

The completion of coursework is followed by a comprehensive examination for granting PhD candidacy. The PhD dissertation is evaluated by two experts of technologically advanced countries and one local expert. Subsequent to positive evaluation from these experts, the PhD scholar is required to undertake an open defence to fulfil the degree requirements. A minimum residency of two years at the university campus and publishing at least one research paper in an impact factor journal of good repute is also an essential requirement to earn a PhD degree.

Eligibility Criteria

- Minimum 18 years of formal education MS/ MSc in omedical/ Materials/ Electrical/ Electronics/ Communication/ Computer/ Mechatronics/ Mechanical/ Industrial Electronics/ Chemical Engineering or equivalent with a minimum CGPA of 3.00 on a 4.00 scale or equivalent.

Note: The students having their previous degree in Mechanical Engineering, Chemical Engineering, Material engineering, Computer Engineering and Software Engineering will be required to take two additional courses in their 1st semester:

Duration:

Minimum 3 years & Maximum 8 years

Degree Requirements:

- Minimum credit hours: 20 credit hours of course work and 30 Cr. Hr. of research.
- The candidates are required to get a minimum CGPA of 3.00.

Selection Criteria:

GRE (Subject)/NTS (Subject)/FEAS Test and interview.

Interview:

The Interview will be conducted to finalize the admission to the subject discipline.

List of Courses

Code	Subject	Cr. Hours
UR- 7110	Ethics in Practice I	1 + 0
UR- 7120	Ethics in Practice II	1 + 0
BM-7000	Biology for Engineers* (Non Credit Course)	3 + 0
BM-7010	Applied Mathematics and Basic Electronics** (Non Credit Course)	3 + 0
BM-7020	Systems Physiology	3 + 0
BM-7110	Cell and Molecular Biology	3 + 0
BM-7120	Molecular Biology	3 + 0
BM-8030	Advanced Biomedical Instrumentation	3 + 0
BM-8130	Biomedical Engineering Systems	3 + 0
BM-8140	Ultrasonic Instrumentation & Imaging	3 + 0
BM-8150	Real Time Systems Design& Applications	3 + 0
BM-8040	Advanced Medical Imaging	3 + 0
BM-8050	Advanced Biomedical Control Systems	3 + 0
BM-8060	Biomedical Devices Design	3 + 0
BM-8070	Selected Topics in Biomedical Engineering	3 + 0
BM-8080	Advance Biomedical Signal Processing	3 + 0
BM-8180	Advanced Biomedical Signals & Systems	3 + 0
BM-8090	Advanced Biomedical Image Processing	3 + 0
BM-8001	Machine Learning	3 + 0
BM-8101	Pattern Recognition	3 + 0
BM-8111	Neuralengineering	3 + 0
BM-8011	Biomedical Sensors	3 + 0
BM-8121	Medical Microsystems	3 + 0

Code	Subject	Cr. Hours
BM-8021	Advanced Biomechanics	3 + 0
BM-8031	Biomedical Optics and Lasers	3 + 0
BM-8041	Advanced Biofluid Mechanics	3 + 0
BM-8051	Nano Biotechnologies	3 + 0
BM-8151	Advanced Techniques in Biotechnology	3 + 0
BM-8061	Modeling & Simulation of Physiological Systems	3 + 0
BM-8071	Brain Computer Interface	3 + 0
BM-8081	Human Computer Interaction	3 + 0
BM-8091	Operations Management	3 + 0
BM-8002	Research Methodology	3 + 0
BM-8012	Advanced Rehabilitation Engineering	3 + 0
BM-8022	Advanced Biomedical Robotics	3 + 0
BM-8032	Biomedical Microprocessor and Interfacing	3 + 0
BM-8132	Embedded Systems & Applications	3 + 0
BM-8042	Advanced Digital Design	3 + 0
BM-8052	Biomaterial Science & Engineering	3 + 0
BM-8152	Advanced Biomaterials	3 + 0
BM-8162	Biomaterials and Drug Delivery	3 + 0
BM-8172	Advances in Tissue Engineering	3 + 0
BM-8062	Telemedicine System	3 + 0
BM-8072	Medical Informatics	3 + 0
BM-8082	Biostatistics	3 + 0
BM-8100	PhD Thesis	30 + 0

RESEARCH GROUPS (BIOMEDICAL ENGINEERING)

BIOMEDICAL INSTRUMENTATION

Team Lead: Dr. Muhammad Shafique

Members: Mashal Fatima, Hamza Toor, Seemab Zakir, Engr. Sarah Hussain

Working: Biomedical instrumentation covers the area of design and development of devices that can detect and measure the physical quantity present in the body.

Currently work on following research projects is being carried out:
- Development of Smart Stick for visually impaired people
- Designing and Fabrication of a low-cost Computer aided auscultation device for developing countries
- Fall Detection Using wearable 3 axis accelerometer
- Designing and fabrication of EEG Measurement system using Gold Electrodes

BIOSIGNAL PROCESSING

Team Lead: Dr. Faraz Akram

Members: Muhammad Zia Ur Rehman, Hamza Toor, Maria Tahir , Muhammad Abdullah

Working: The Bio-Signal Processing group at Riphah International University investigates the use of signal processing and machine learning techniques for the analysis and classification of biomedical signals, with special emphasis on EEG, EMG, and ECG signals.

Currently, the group is engaged in the following research projects.
- EEG based Brain-Computer Interfaces
- Design and Development of EMG Controlled Prosthetics
- Stress Detection using Pulse Rate Variability
- Non-invasive blood glucose monitoring

BIOMECHANICS

Team Lead: Dr. Muhammad Zia Ur Rehman

Members: Faisal Amin, Partab Rai, Dr. Sara Rehman, Hamza Zafar, Anas Saleem

Working: Biomechanics is the study and application of physical laws on living organisms. It includes ergonomics, orthopedic biomechanics, sports mechanics, rehabilitation mechanics etc. The group of biomechanics has been involved in several research projects and led to publish numerous conference and journal articles of international repute. The titles of main ongoing projects are given below:
- Footwear Affects Biomechanical Work and Knee Adduction Moment during Stance Phase in Medial Knee Osteoarthritic Male Pakistani Adults
- Pushing a Manual Wheelchair Requires More Muscular Force than Pulling
- Effect of toe-out and toe-in postures on static standing balance
- Effect of bunion on plantar pressure distribution

Funded Research-Projects, Biomedical Engineering Department (2018-2020)

S.No	Title of Funded Project	Funding Body	Principal Investigator (P.I)	Funding Amount of Project (PKR)	Completion Status
1	Development of Indigenous Ventilators	Pakistan Science Foundation (PSF)	Dr. Muhammad Shafique	12 Million	In-Progress
2	Assistive Device for Visually impaired people	HEC, Pakistan	Dr. Muhammad Shafique (Co.PI)	14 Million	In-Progress
3	An Affordable brain-computer interface (BCI) for upper limbs paralyzed patient	HEC, Pakistan	Dr. Muhammad Shafique	2.339 Million	In-Progress
4	Modular Hybrid Prosthetic arm design	RARE/ORIC Riphah	Dr. Faraz Akram	0.15 Million	In-Progress
5	Development of wireless-based wearable sensors systems for athletes	RARE/ORIC-Riphah	Dr. Muhammad Shafique	0.15 Million	In-Progress
6	Determination of cancerous cells by metallic nano-particles	RARE/ORIC-Riphah	Dr. Muhammad Shafique	0.05 Million	Completed
7	Automatic detection of emotional states using EEG	RARE/ORIC-Riphah	Dr. Muhammad Shafique	0.05 Million	Completed
8	Robotic hand controlled by EMG Signals and Sensors systems	RARE/ORIC-Riphah	Dr. Faraz Akram	0.05 Million	Completed
9	Designing and Fabrication of Bio-potential Electrodes using Nano-Technology for EEG Measurement	RARE/ORIC-Riphah	Dr. Muhammad Shafique	0.05 Million	Completed

Funded Final-Year-Projects (FYPs), Biomedical Engineering Department (2019-2020)

S.No	Title of Funded FYP	Funding Body	Project Supervisor	Funding Amount of Project (PKR)	Year	Completion Status
1	DesignÂ of Low-Cost and Soft Ankle-FootÂ OrthosisÂ for Post-Stroke Patients	Ignite/NGIRI	Engr. Pertab Rai	0.071 Million	2,020	Completed
2	Early diagnosis of Parkinsonâs disease using speech recognition.	Ignite/NGIRI	Dr.Faraz Akram	0.054 Million	2,020	Completed
3	Tackling Intellichair for Allocated Nonwalkers	Ignite/NGIRI	Dr. Haris Shehzad	0.0 43 Million	2,020	Completed
4	Correlation of Balance assessment tool with motion analysis parameter	Ignite/NGIRI	Dr. Faraz Akram	0.037 Million	2,020	Completed
5	Development of Assistive device for lower limb disorder	Ignite/NGIRI	Engr. Faisal Amin	0.069 Million	2,020	Completed
6	Development Of A Software That Assists Speech Therapy In Urdu	Ignite/NGIRI	Engr. Hamza Toor	0.022 Million	2,019	Completed
7	Detection Of Neuroplasticity By Using A Low Cost Open Bci System	Ignite/NGIRI	Dr. Faraz Akram	0.033 Million	2,019	Completed
8	Design and Fabrication of Medial Knee Unloader Via Reverse Engineering	Ignite/NGIRI	Engr. Faisal Amin	0.079 Million	2,019	Completed
9	Prototype of wearable exoskeletal unit using pneumatiic actuator muscle and soft robotics	Ignite/NGIRI	Engr.Kiran Anas	0.021 Million	2,019	Completed
10	Smart Visual Stethoscope	Ignite/NGIRI	Engr. Hamza Toor	0.038 Million	2,019	Completed

Impact Factor Publications , January 2020-March 2021 (Biomedical Engineering Department)

S.No	Name of Riphah's Author	Publication Title	Journal Name	ISSN	Category	Impact Factor
1	Muhammad Zia ur Rehman, Faisal Amin and Muhammad Shafique	Leveraging ANN and LDA Classifiers for Characterizing Different Hand Movements Using EMG Signals	Arabian Journal for Science and Engineering	1761–1769	W	1.711
2	Muhammad Zia ur Rehman, Imran Amjad and Muhammad Shafique	Decoding Attempted Hand Movements in Stroke Patients Using Surface Electromyography	Sensors	1424-3210	W	3.27
3	Muhammad Zia ur Rehman	A Multiday Evaluation of Real-Time Intramuscular EMG Usability with ANN	Sensors	1424-3210	W	3.27
4	Muhammad Zia ur Rehman	Synthesis and Characterization of CoFe2O4/ MWCNTs Nanocomposites and High-Frequency Analysis of Their Dielectric Properties	Journal of Materials Engineering and Performance	1059-9495	W	1.65
5	Faraz Akram	Traffic Congestion Avoidance System Using Foreground Estimation and Cascade Classifier	IEEE Access	2169-3536	W	3.745
6	Seemab Zakir	Deep learning based diagnosis of COVID-19 using chest CT-scan images	IEEE Access	2169-3536	W	3.745
7	Muhammad Shafique Imran Amjad	Functional Connectivity Analysis on Resting-State Electroencephalography Signals Following Chiropractic Spinal Manipulation in Stroke Patients	Brain Sciences	-	W	3.33
8	Imran Amjad, Hamza GHazanfer toor, Muhammad Shafique	Acute Effects of Aerobic Exercise on Somatosensory-Evoked Potentials in Patients with Mild Cognitive Impairment	Brain Sciences	-	W	3.33
9	Muhammad Shafique	Eye & Voice-Controlled Human Machine Interface System for Wheelchairs Using Image Gradient Approach	Sensors	1424-3210	W	3.27
10	Muhammad Shafique	Construction and Analysis of a Novel Wearable Assistive Device for a Visually Impaired Person	Applied Bionics and Biomechanics	-	W	1.41
11	Muhammad Shafique	Neuro-Fuzzy Control of Sit-to-Stand motion using Head Position Tracking	Measurement and Control	-	W	1.49
12	Muhammad Shafique	Cartesian Control of Sit-to-Stand Motion Using Head Position Feedback	Applied Bionics and Biomechanics	-	W	1.41
13	Muhammad Shafique	Performance Evaluation of Convolutional Neural Network for Hand Gesture Recognition Using EMG	Sensors	1424-3210	W	3.27

Alumni Comments

Hamza Bin Zafar

Batch: 2016 BSc. Biomedical Engineering

About Riphah:

My experience at Riphah international university has been positive. The best thing about Riphah university is their Biomedical department. Students are encouraged for research projects that makes them intellectual and multi talented .Faculty is very much cooperative with students .I apart from studies, university focus on personality development of students by arranging different seminars and workshops

Bilal Siddique

Batch: 2016 BSc. Biomedical Engineering

About Riphah:

With a key focus on research, Riphah International University provides students with the right environment and tools to develop their skills and forge their ideas into reality. The experienced faculty is continually supportive and ensures that no student is left behind.

Kashaf Gulzar

Batch: 2016 BSc. Biomedical Engineering

About Riphah:

"Riphah seemed to be the best place that offered me opportunities to grow as a person and set challenges, far beyond those of other institutes. The strong support of the faculty members not only helped me score good grades but also encouraged me to face the risks and learn new things. Last but not least Riphah gave me friendships and experiences that added a different perspective to my life.

Amna Khan

Batch: 2016 BSc. Biomedical Engineering

About Riphah:

"The goal of education is the advancement of knowledge and dissemination of truth. Riphah international university has provided a very congenial environment with highly skilled faculty to achieve this. There are tremendous amounts of research opportunities for the students as well as well informed staff to guide them. It is truly determined to provide the best for its students."

Department of
Mathematics and Statistics

Department of Mathematics and Statistics

Department of
MATHEMATICS AND STATISTICS

On behalf of Department of Mathematics and Statistics I welcome all the prospective students. Department of Mathematics and Statistics aims to pursue excellence in teaching and research by developing appropriate curricula and teaching practices. The department acquires services of competent PhD faculty members in all basic disciplines of Mathematics and Statistics in order to provide environment which is conducive to both teaching and learning. Moreover, the departments aims at developing soft skills of students that would be beneficent for their future careers. The department provides service to the entire University from undergraduate students to graduate students in mathematics and statistics courses.

The department offers degree programs of BS, M.Sc., and M.Phil. and PhD levels. Thus, every student who gets admission in BS or M.Sc. has the opportunity to complete M.Phil. leading to PhD degree. We believe that if we have good and competent Mathematicians/Statisticians, we can bring revolution in our education, industry and latest modern technologies. Graduates of our department are serving in various educational and R&D departments/institutes across the whole country. Apart from normal teaching, our highly qualified faculty of international repute is actively involved in research in diverse fields of Pure, Applied and Computational Mathematics and Statistics.

The department provides a forum for researchers and graduate students to present their latest research. Scientists and educationists from outside the department are also invited to stimulate the intellectual life of the department through their lectures and seminars.

The department, therefore, organizes several events, such as National/International workshops on MATLAB/MATHEMATIKA and MAPLE, etc. and related topics, short visits of Foreign professors for series of lectures for research students and collaboration and Conferences at National and International levels in collaboration with different research organizations. The department aims to establish and promote RIPHAH as a leading University for teaching and research in Mathematical Sciences and Statistics both within Pakistan and internationally.

Dr Muhammad Asad Zaighum
Associate Professor, HOD

Faculty of
MATHEMATICS AND STATISTICS DEPARTMENT

Dr. Muhammad Asad Zaighum

Designation:	Associate Professor & Head of Department
Qualification:	PhD Mathematics, Government College University Lahore, Pakistan
Field of Interest:	Functional Analysis, Harmonic Analysis, Mapping Properties of Integral Operators in Banach Function Spaces, Complex Interpolation
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Dr. Muhammad Aslam

Designation:	Professor
Qualification:	PhD Statistics, University of Wales, UK
Field of Interest:	Mathematical Statistics, Paired Comparison Models, Bayesian Inference
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Dr. Muhammad Afzal Rana

Designation:	Professor
Qualification:	PhD Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest:	Fluid Mechanics
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Dr. Muhammad Yaqub Khan

Designation:	Associate Professor
Qualification:	PhD Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest:	Plasma Physics
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Dr. Abdullah Shoaib

Designation:	Assistant Professor
Qualification:	PhD Mathematics, International Islamic University Islamabad, Pakistan
Field of Interest:	Fixed Point Theory
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Dr. Ambreen Bano

Designation:	Assistant Professor
Qualification:	PhD Mathematics, Riphah International University, Islamabad, Pakistan.
Field of Interest:	Fluid Mechanics, Numerical solutions of ODE's and PDE's.
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Designation:	Assistant Professor
Qualification:	PhD Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest:	Fuzzy Algebraic Structures
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Mr. Hammad Nafis

Designation:	Assistant Professor
Qualification:	MPhil Math Quaid-i-Azam University Islamabad, Pakistan, (PhD in prograss)
Field of Interest:	Algebra
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	+92 (51) 8446000 Ext: 253

Dr. Rehana Rahim

Designation:	Assistant Professor
Qualification:	PhD Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest:	General Relativity and Cosmology
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Dr. Muhammad Ijaz Khan

Designation:	Assistant Professor
Qualification:	Ph.D. Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest :	
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Dr. Shahid Farooq

Designation:	Assistant Professor
Qualification:	Ph.D. Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest :	
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Dr. Mursala Khan

Designation:	Assistant Professor
Qualification:	Ph.D. Mathematics, Freie Universität Berlin, Germany
Field of Interest :	Survey Sampling, Randomized Response
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Ms. Sadia Nadir

Designation:	Senior Lecturer
Qualification:	MPhil Statistics, Quaid-i-Azam University Islamabad, Pakistan, (PhD in prograss)
Field of Interest:	Survey Sampling
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Ms. Shehzadi Salma Kanwal

Designation: Senior	Senior Lecturer
Qualification:	MPhil Mathematics, Quaid-i-Azam University Islamabad, Pakistan (PhD in progress)
Field of Interest:	Algebra
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Mr. Abbas Ali

Designation:	Lecturer
Qualification:	MPhil Mathematics (PhD In Progress), Riphah International University Islamabad
Field of Interest:	Rough Set Theory, Decision Making
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Mr. Mudassir Shams

Designation:	Lecturer
Qualification:	MPhil Mathematics (PhD In Progress), Riphah International University Islamabad
Field of Interest:	Numerical Analysis, Integral Inequalities
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Ms. Saira Jahangir

Designation:	Lecturer
Qualification:	MPhil Mathematics, Quaid-i-Azam University Islamabad, Pakistan (PhD in progress)
Field of Interest:	Algebra, Algebraic Cryptography, Algebraic Coding Theory, Elementary Number Theory
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Mr. Zeeshan Ashraf

Designation:	Teaching Fellow
Qualification:	MPhil Statistics, Quaid-i-Azam University, Islamabad (PhD In Progress)
Field of Interest:	Statistics

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Ms. Shar Naseem

Designation:	Teaching Fellow
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Field of Interest:	Numerical Analysis
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Coordination Office

Mr. Muhammad Zeshan Ayub

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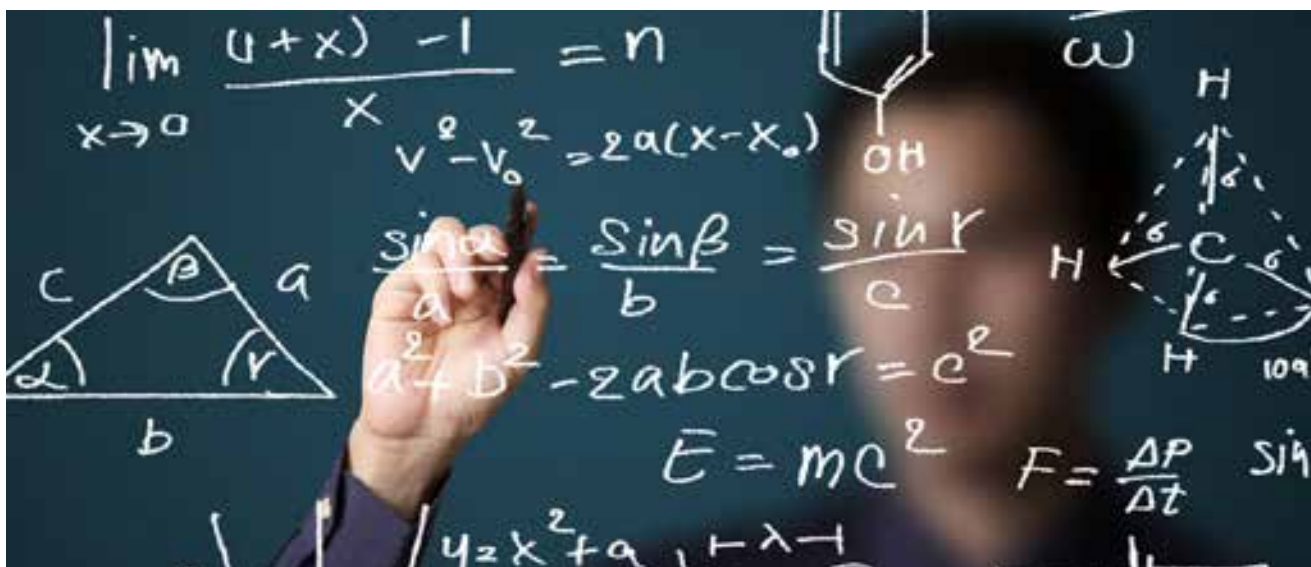Tel: +92 (51) 8446000 Ext: 280

BS Mathematics

Mathematics is considered as one of the academic disciplines of the basic sciences. It is the basis in learning and understanding the other science subjects. This is why, it is called "Mother of All Sciences".

Mathematics can contribute in all branches of Engineering, industry, Management, Metrology, Teaching and Research. We believe that, if we have good and Competent Mathematicians, we can bring revolution in our Education, Industry and latest Modern Technologies. The aim of department of mathematics and statistics is to pursue excellence in teaching and research by developing appropriate curricula and teaching practices, acquiring highly talented faculty and providing an environment conducive to teaching and learning.

Presently, Department is offering MSc, MPhil and PhD programs and from Fall Semester, 2018, department is also offering BS-4Year Program in mathematics. The department provides service to the entire university, from undergraduate students to graduate students in mathematics courses and other departments who need to upgrade the quantitative and mathematical skills of their students.

Eligibility Criteria

Intermediate securing at least 45% marks in aggregate.

Or

Any other examination of a Foreign University/ Institution / Examining Body, equivalent to intermediate. Equivalence and percentage of marks will be determined by IBCC.

Or

Diploma of Associate Engineering Examination, securing at least 60% marks in aggregate.

Admission Criteria:

Academic Qualification	60%
Interview/Entry Test	40%

Intake

Fall & Spring
Class Timings: Mornings/Afternoons

Duration:

Four years program spread over 8 semesters.

Credit hours breakup of courses

Domain	Number of Courses	Number of Credit Hours
Compulsory Courses	9	25
General Courses	8	22
Discipline Specific Foundation Courses	10	30
Major Courses Including Project Report	10+Project Report	36
Elective Courses	6	18
	43+Project Report	131

Teaching and Research faculty

Department of mathematics has well qualified and experienced faculty. It also has access to foreign faculty members through the HEC foreign faculty hiring program. The faculty at department of mathematics is not limited to a narrow range of mathematical specialties; the specializations of the faculty are spread throughout the mathematical spectrum, so students can inquire about any mathematical topic.

Course and Credit Hour Requirements:

A total of 131 credit hours are required to complete 4-Year Bachelor of Science in Mathematics.

Project Report

Every student has to write project report for specialization during 7th - 8th semester
Available Seats   30 per semester
Credit Hours   131

Career in Mathematics

Mathematics has a wide spectrum and variety of important applications, there is, therefore a constant demand for well-trained mathematicians in a wide range of career choices. The academic programs are designed in such a way that they meet the international standards and also provide wide variety of jobs, in teaching, Industry, Accounting, Research, Organizations, such as, PIEAS, PAEC, SUPARCO, AQ khan labs, PIA, Meteorology, etc.

Key Features

*   Highly qualified National and International PhD Faculty.
*   Well-equipped computer labs.
*   IT-oriented Program
*   Student seminars on regular basis
*   Opportunities for admission to MPhil / PhD program
*   Opportunity for most motivated students to publish research articles in International Journals.

Research Publications:

The department of mathematics not only emphasizes on quality teaching but is also producing research on international level. Department of Mathematics is the major contributor to research publications at Riphah.

Computer Facilities

The mission of Riphah is to ensure that all students and staff have a wide range of IT facilities available to them, and that all students entering Riphah have the chance to acquire sound IT skills. Various Computer Algebra Systems (math software), such as MATLAB, MAPLE, MATHEMATICA, SCIENTIFIC WORKPLACE, etc are available for students and researchers. The pervasive network provides access to local and national electronic information services, library catalogue, email, virtual learning environments, and all the other facilities needed for learning and research.

Seminars

Apart from normal teaching, the faculty of mathematics department is actively involved in research. The department of mathematics provides a forum for researchers and graduate students to present their latest research. Scientists and educationists from outside the department are also invited to stimulate the intellectual life of the department through their lectures and seminars.

Workshops, Short Visits and Conferences

In addition to academic activities the department also organizes several events as follows:
*   The department has the honor of organizing national/international workshops on mathematics and related topics.
*   The department also arranges short visits of foreign professors for series of lectures for research students and collaboration.
*   Department arranges Conferences at National and International levels in collaboration with different research organizations.

List of Courses

Semester-I

Code	Title	Cr. Hrs
MAT-1001	Calculus-I	(3,0)3
MAT-1002	Elements of Set Theory & Logic	(3,0)3
ENG-1003	English-I (Functional English)	(3,0)3
CS-1024	Programming Fundamentals	(3,1)4
Xxx	General Course-I	(3,0)3
UR-150	Islamic Studies	(2,0)2
	Total Credit Hours	**(17,1)18**

Semester-2

Code	Title	Cr. Hrs
MAT-1003	Calculus-II	(3,0)3
MAT-1004	Software Packages (MATLAB/ MAPLE/ MATHEMATICA etc.)	(2,1)3
MAT-1005	Linear Algebra	(3,0)3
ENG-1006	English-II (Communications Skills)	(3,0)3
UR-250	Pakistan Studies	(2,0)2
xxx	General Course-II	(3,0)3
	Total Credit Hours	**(16,1)17**

Semester-3

Code	Title	Cr. Hrs
MAT-2001	Calculus-III	(3,0)3
MAT-2002	Group Theory-I	(3,0)3
ENG-203	English III(Technical writing and Presentation Skills)	(3,0)3
UR-350	Revealed Sciences-I	(2,0)2
MAT-2003	Affine and Euclidean Geometry	(3,0)3
MAT-2004	Discrete Mathematics	(3,0)3
	Total Credit Hours	**(17,0)17**

Semester-4

Code	Title	Cr. Hrs
MAT-2005	Real Analysis-I	(3,0)3
STS 2006	Introduction to Statistics	(3,0)3
FL-254	Foreign Language	(3,0)3
MAT-2007	Ordinary Differential Equations-I	(3,0)3
MAT-2008	Introduction to Mechanics	(3,0)3
UR-550	Professional Ethics	(2,0)2
	Total Credit Hours	**(17,0)17**

Semester-5

Code	Title	Cr. Hrs
MAT-3011	Real Analysis-II	(3,0)3
MAT-3012	Ordinary Differential Equations-II	(3,0)3
MAT-3013	Set Topology	(3,0)3
MAT-3014	Mathematical Statistics	(3,0)3
MAT-3015	Complex Analysis	(3,0)3
UR-450	Revealed Sciences – II	(2,0)2
	Total Credit Hours	**(17,0)17**

Semester-6

Code	Title	Cr. Hrs
MAT-3016	Functional Analysis-I	(3,0)3
MAT-3017	Differential Geometry	(3,0)3
MAT-3018	Partial Differential Equations	(3,0)3
MAT-3019	Analytical Mechanics	(3,0)3
MAT-3020	Numerical Methods	(3,0)3
	Total Credit Hours	**(15,0)15**

Semester-7

Code	Title	Cr. Hrs
MAT-4030	Rings and Fields	(3,0)3
MAT-xxx	Elective-I	(3,0)3
MAT-xx	Elective II	(3,0)3
MAT-xx	Elective III	(3,0)3
MAT-4032	Project (Continued)	(3,0)3
	Total Credit Hours	**(15,0)15**

Semester-8

Code	Title	Cr. Hrs
MAT-4031	Integral Equations	(3,0)3
MAT-xx	Elective-IV	(3,0)3
MAT-xx	Elective-V	(3,0)3
MAT-xx	Elective-VI	(3,0)3
MAT-4032	Project	(3,0)3
	Total Credit Hours	**(15,0)15**

Elective Courses for BS Mathematics Program

Sr. No	Elective Courses	Code
1	Measure and Integration	MAT 4034
2	Special Functions	MAT 4035
3	Operation Research	MAT 4036
4	Optimization Theory	MAT 4037
5	Functional Analysis II	MAT 4038
6	Theory of Modules	MAT 4039
7	Analytical Dynamics	MAT 4040
8	Fluid Mechanics I	MAT 4041
9	Fluid Mechanics II	MAT 4042
10	Plasma Theory	MAT 4043
11	Combinatory	MAT 4044
12	Group Theory II	MAT 4045
13	Calculus of Variations	MAT 4046
14	Mathematical Modeling and Simulation	MAT 4047

Sr. No	Elective Courses	Code
15	Numerical Analysis	MAT 4048
16	Number Theory	MAT 4049
17	Mathematical Methods	MAT 4050

General Courses for BS Mathematics Program

Sr. No	Elective Courses	Code
1	Physics-I	PHY-1081
2	Physics-II	PHY-1082
3	Revealed Sciences-I	UR-350
4	Revealed Sciences-II	UR-450
5	Professional Ethics	UR-550
6	Introduction to Business Administration	IBS-105

BS Statistics (4-Year)

Mission Statement

The Riphah International University is committed to a holistic and integrated approach in education character building, intellectual and academic development, for us, is equally important. We want to build total human personality of our youth with concern for the welfare of humanity. A value based education alone, in our view can produce a generation of dynamic, committed and progressive, leaders and builders of the Ummah.

Programme Objectives

Following are the main objectives of BS Program:

1. To equip the graduates with knowledge of statistical theory, statistical software and techniques of data collection and analysis so that they can compete in the job market and contribute towards the economic development of Pakistan.

2. To provide a sound footing of the subject matter of statistical theory so that they can pursue higher degrees and research in the field of Statistics.

Learning Outcomes

The Discipline Statistics offers a BS degree program in the department of Mathematics and Statistics.

1. The Statistics graduate will have good working knowledge of the most commonly used statistical methods including:

   i. Efficient design of studies and construction of effective sampling plans.

   ii. Exploratory data analysis.

   iii. Statistical modeling and omnipresent role of variability

   iv. Formal inference process.

2. They will be able to synthesize and apply knowledge of common inferential methods understanding the limitations of the procedure and the appropriate scope of conclusion.

3. The students will have good mystery of several standard statistical software packages and facility with data management strategies.

4. They will have focused concentration in an area of application for discipline of Statistics.

Eligibility Criteria

FA/FSc or equivalent (at least 2nddivision) or diploma of associate engineering examination securing at least 45% marks in aggregate.

Duration:

Four years program spread over 8 semesters, two semesters per year.

Course and Credit Hour Requirements:

A total of 130 credit hours are required to complete Bachelor of Science in Statistics.

Total Credit Hours of the Program

Sr. No.	Categories	No. of courses	Credit hours
1	Compulsory Courses	9	25
2	General Courses	10	30
3	Foundation Courses	5	15
4	Major Courses	15	45
5	Elective Courses	5	15
	Total	**44**	**130**

Scheme of Studies

Semester-1

Code	Title	Cr. Hrs
STAT-1001	Introductory Statistics	3
CS-1001	Introduction to Computer	3
ENG-1003	English-I (Functional English)	3
MAT-1001	Calculus-I	3
UR-150	Islamic Studies	2
XXX	General-I	3
Total Credit Hours		**17**

Semester-2

Code	Title	Cr. Hrs
STS-1002	Introduction to Probability Theory	3
ENG-1006	English-II (Communication Skills)	3
MAT-1003	Calculus-II	3
UR-250	Pakistan Studies	2
XXX	General-II	3
XXX	General-III	3
Total Credit Hours		**17**

Semester-3

Code	Title	Cr. Hrs
STS-2001	Basic Statistical Inference	
XXX	Foreign Language	3
ENG-2003	English-III (Technical Writing and Presentation) Skills)	3
MAT-2001	Calculus-III	3
UR-550	Professional Ethics	2
XXX	General-IV	3
Total Credit Hours		**17**

Semester-4

Code	Title	Cr. Hrs
STS-2003	Introduction to Regression Analysis and Experimental Designs ExperExperimental	3
STS-2004	Applied Statistics	3
XXX	General-V	3
MAT-1005	Linear Algebra	3
UR-350	Revealed Sciences-I	2
MAT-3020	Numerical Methods	3
Total Credit Hours		**17**

Semester-5

Code	Title	Cr. Hrs
STS-3001	Probability Theory – I	3
STS-3002	Statistical Methods	3
STS-3003	Sampling Techniques	3
STS-3004	Computational Techniques in Statistics	2
STS-3005	Non-Parametric Statistical Methods	3
UR-450	Revealed Sciences-II	3
Total Credit Hours		**17**

Semester-6

Code	Title	Cr. Hrs
STS-3051	Probability Theory-II	3
STS-3052	Experimental Design-I	3
STS-3053	Estimation Methods	3
STS-3054	Survey Sampling	3
STS-3055	Regression Analysis	3
Total Credit Hours		**15**

Semester-7

Code	Title	Cr. Hrs
STS-4001	Experimental Design-II	3
STS-4002	Hypothesis Testing	3
STS-4003	Multivariate Statistics	3
STS-4004	Econometrics	3
STS-4005	Quality Control and Management	3
Total Credit Hours		**15**

Semester-8

Code	Title	Cr. Hrs
STS-	5 Elective/Optional Courses	3
STS-		3
STS-		3
STS-		3
STS-		3
Total Credit Hours		**15**

BS Mathematics (Weekend) (For B.Sc. & ADP-Science Degree Holders)

Mathematics is considered as one of the academic disciplines of the basic sciences. It is the basis in learning and understanding the other science subjects. This is why, it is called "Mother of All Sciences". Mathematics can contribute in all branches of Engineering, industry, Management, Metrology, Teaching and Research. We believe that, if we have good and Competent Mathematicians, we can bring revolution in our Education, Industry and latest Modern Technologies. The aim of department of mathematics and statistics is to pursue excellence in teaching and research by developing appropriate curricula and teaching practices, acquiring highly talented faculty and providing an environment conducive to teaching and learning. Presently, Department is offering MSc, MPhil and PhD programs and from Fall Semester, 2018, department is also offering BS-4Year Program in mathematics. The department provides service to the entire university, from undergraduate students to graduate students in mathematics courses and other departments who need to upgrade the quantitative and mathematical skills of their students.

Eligibility Criteria

BSc securing at least 45% marks in aggregate.
Or ADP with 45% marks in aggregate.

Selection Criteria:

Academic Career	60%
Interview/Entry Test	40%

Class Timings:

Friday	4:00pm-8:00pm
Saturday	2:00pm-8:00pm
Sunday	8:00am-8:00pm

Intake:

Fall & Spring

Duration:

For B.Sc. degree holder:	2.5 Years
For ADP holder:	2 years

- **Entry point for B.Sc. Degree Holders:**

The student may be admitted in 5th semester. However, he/she shall need to complete 71 credit hours courses out of which 15-18 credit hours of courses will be from the list of Compulsory courses and will be prescribed by the department given below:

List of Deficiency Courses

Code	Title	Cr. Hrs
CS-024	Programming Fundamentals	4
---	General Course-I	3
---	General Course-II	3
MAT-1004	Software Package-I	3
MAT-2004	Discrete Mathematics	3
FL-254	Foreign Language	3
MAT-2002	Group Theory-I	3
MAT-2005	Real Analysis-I	3
UR-550	Professional Ethics	2
UR-350	Revealed Sciences-I	3

- Entry point for Associate Degree of Science ADP-Science(2 years) Holders:

The student may be admitted in 5th semester without doing any deficiency courses.

Scheme of Studies

Semester-1

Code	Title	Cr. Hours
MAT-3011	Real Analysis-II	(3,0)3
MAT-3012	Ordinary Differential Equations-II	(3,0)3
MAT-3013	Set Topology	(3,0)3
MAT-3014	Mathematical Statistics	(3,0)3
MAT-3015	Complex Analysis	(3,0)3
UR-450	Revealed Sciences – II	(2,0)2
	Sub-Total	**(17,0)17**

Semester-2

Code	Title	Cr. Hours
MAT-3016	Functional Analysis-I	(3,0)3
MAT-3017	Differential Geometry	(3,0)3
MAT-3018	Partial Differential Equations	(3,0)3
MAT-3019	Analytical Mechanics	(3,0)3
MAT-3020	Numerical Methods	(3,0)3
	Sub-Total	**(15,0)15**

Semester-3

Code	Title	Cr. Hours
MAT-4030	Rings and Fields	(3,0)3
MAT-xxx	Elective-I	(3,0)3
MAT-xx	Elective II	(3,0)3
MAT-xx	Elective III	(3,0)3
MAT-4032	Project (Continued)	(3,0)3
	Sub-Total	**(15,0)15**

Semester-4

Code	Title	Cr. Hours
MAT-4031	Integral Equations	(3,0)3
MAT-xx	Elective-IV	(3,0)3
MAT-xx	Elective-V	(3,0)3
MAT-xx	Elective-VI	(3,0)3
MAT-498	Project	(3,0)3
	Sub-Total	**(15,0)15**

Diploma in Medical Statistics

Mission Statement

The Riphah International University is committed to a holistic and integrated approach in education character building, intellectual and academic development, for us, is equally important. We want to build total human personality of our youth with concern for the welfare of humanity.

A value based education alone, in our view can produce a generation of dynamic, committed and progressive, leaders and builders of the Ummah.

Program Objectives

Following are the main objectives of the Program:

1. To equip the graduates with knowledge of medical statistics theory, particularly focusing on data analysis and result interpretation using different statistical software's.

2. To provide a sound knowledge of the subject matter of statistical theory so that they can pursue research in the field of medical sciences.

3. To apply statistical methods to study new and pressing medical and public health problems.

Eligibility Criteria

One year program spread over 2 semesters having classes on weekend/evening.

Course and Credit Hours Requirements:

A total of 16 credit hours are required to complete Diploma in Medical Statistics.

Scheme of Studies

Semester-1

Code	Title	Cr. Hours
MST-5001	Introduction to Biostatistics	2
MST-5002	Data Analysis in Public Health	2
MST-5003	Survival Analysis	2
MST-5004	Regression Analysis for Biostatistics	2
Total Credit Hours Semester-I		**8**

Semester-2

Code	Title	Cr. Hours
MST-5005	Statistical Analysis of Clinical Trials	2
MST-5006	Multivariate Analysis in Medical Sciences	2
MST-5007	Categorical Data Analysis	2
MST-5008	Statistical Genetics	2
Total Credit Hours Semester-I		**8**

M.Phil Mathematics

The Department of Mathematics & Statistics, Riphah International University offers Graduate Programs leading to the degree of Master of Philosophy in mathematics. The diversity of graduate courses offered in the department gives the student an opportunity to specialize in one of the several fields of Pure Mathematics, Applied Mathematics and Computational Mathematics. The course curriculum for the four semesters is listed below:

Eligibility Criteria

- 16 years of education in the relevant field from a recognized institution with minimum 50% marks

                        OR

- CGPA 2.0/4.00
- GAT (General)/ UAT (General) with 50% score

Selection Criteria:

UAT/GAT General Test:	Passed
Academic Career	60%
Interview	40%

Duration:

Minimun 2 years & Maximum 4 years

Class Timings:

Saturday	2:00 pm - 8:00 pm
Sunday	8:00 am - 7:00 pm

Semester-1

Code	Title	LT	LB	CR
MAT xxx	Core-I	3	0	3
MAT xxx	Core-II	3	0	3
MAT xxx	Elective I	3	0	3
MAT xxx	Elective II	3	0	3
UR xxx	Ethics in Practice-I	1	0	1
Sub-Total				**13**

Semester-2

Code	Title	LT	LB	CR
MAT xxx	Core-III	3	0	3
MAT xxx	Core-IV	3	0	3
MAT xxx	Elective III	3	0	3
MAT xxx	Elective IV	3	0	3
UR xxx	Ethics in Practice-II	1	0	1
Sub-Total				**13**

Semester-3

Code	Title	LT	LB	CR
MAT 699	Dissertation	0	0	3
Sub-Total				**3**

Semester-4

Code	Title	LT	LB	CR
MAT 699	Dissertation (Continued)	0	0	3
Sub-Total				**3**

Total Credit Hours: 32

List of MPhil Courses

Code		Course Title	Cr. Hours
MAT	7001	Advanced Functional Analysis	(3-0-3)
MAT	7009	Advanced Ring Theory-I	(3-0-3)
MAT	7041	Advanced Numerical Analysis	(3-0-3)
MAT	7078	Mathematical Techniques for Boundary Value Problem	(3-0-3)
MAT	7044	Computational Fluid Dynamics	(3-0-3)
MAT	7071	Symmetries and Exact Solutions of Differential Equations	(3-0-3)
MAT	7016	Advanced Real Analysis	(3-0-3)
MAT	7042	Numerical Solution of Partial Differential Equations	(3-0-3)
MAT	7013	Advanced Graph Theory	(3-0-3)
MAT	6071	Advanced Partial Differential Equations	(3-0-3)
MAT	6001	Topological Vector Spaces	(3-0-3)

Code		Course Title	Cr. Hours
MAT	7001	Advanced Functional Analysis	(3-0-3)
MAT	6002	Algebraic Topology	(3-0-3)
MAT	7002	Theory of Complex Variables	(3-0-3)
MAT	7003	Fixed Point Theory and Applications-I	(3-0-3)
MAT	7004	Fixed Point Theory and Applications-II	(3-0-3)
MAT	6003	Approximation Theory and Applications	(3-0-3)
MAT	6004	Field Extensions & Galois Theory	(3-0-3)
MAT	6005	Algebraic Number Theory	(3-0-3)
MAT	7005	Measure Theory	(3-0-3)
MAT	7006	Fourier Analysis	(3-0-3)
MAT	7007	Semigroup Theory	(3-0-3)
MAT	7008	LA-Semigroups	(3-0-3)

Code		Course Title	Cr. Hours
MAT	7009	Advanced Ring Theory-I	(3-0-3)
MAT	7010	Advanced Ring Theory-II	(3-0-3)
MAT	6006	Theory of Group Actions	(3-0-3)
MAT	6007	Theory of Group Graphs	(3-0-3)
MAT	7011	Rough set theory and its Applications	(3-0-3)
MAT	7012	Fuzzy Logic and Algebra	(3-0-3)
MAT	7013	Advanced Graph Theory	(3-0-3)
MAT	7014	Theory of Function Spaces	(3-0-3)
MAT	7015	Harmonic Analysis	(3-0-3)
MAT	7016	Advanced Real Analysis	(3-0-3)
MAT	7017	Spectral Graph Theory	(3-0-3)
MAT	6008	Advanced Category Theory	(3-0-3)
MAT	6009	Theory of Locales	(3-0-3)
MAT	7018	Topological Indices of Chemical Graphs	(3-0-3)
MAT	7019	Young Tableaux with Applications	(3-0-3)
MAT	6010	Advanced Riemannian Geometry	(3-0-3)
MAT	6011	Knots Theory with Applications	(3-0-3)
MAT	6012	Fuzzy Logic and its Applications	(3-0-3)
MAT	8030	*Topics in Pure Mathematics	(3-0-3)
MAT	6041	Analysis of Algorithms	(3-0-3)
MAT	6042	Advanced Optimization Theory	(3-0-3)
MAT	7041	Advanced Numerical Analysis	(3-0-3)
MAT	7042	Numerical Solution of Partial Differential Equations	(3-0-3)
MAT	6043	Advanced Integral Equations	(3-0-3)
MAT	7043	Integral Inequalities	(3-0-3)
MAT	6044	Theory of Splines	(3-0-3)
MAT	6045	FEM for Partial Differential Equations	(3-0-3)
MAT	7044	Computational Fluid Dynamics	(3-0-3)
MAT	7045	Mathematical Methods in Biomathematics	(3-0-3)
MAT	7046	Fuzzy Differential Equations	(3-0-3)
MAT	8041	Advanced Finite Element Analysis	(3-0-3)
MAT	8042	Financial Mathematics-I	(3-0-3)
MAT	8043	Financial Mathematics-II	(3-0-3)

Code		Course Title	Cr. Hours
MAT	8044	Stochastic Calculus-I	(3-0-3)
MAT	8045	Stochastic Calculus-II	(3-0-3)
MAT	7047	Advanced Topics in Numerical Analysis	(3-0-3)
MAT	7048	Enumerative Combinatorics	(3-0-3)
MAT	8060	*Topics in Computation Mathematics	(1-1-0)
MAT	7071	Symmetries and Exact Solutions of Differential Equations	(1-0-0)
MAT	7072	Mathematical Analysis of Heat Transfer	(3-0-3)
MAT	7073	Advanced Analytical Dynamics	(6-0-6)
MAT	7074	Perturbation Methods	(3-0-3)
MAT	7075	Non-Newtonian Fluid Mechanics	(3-0-3)
MAT	6071	Advanced Partial Differential Equations	(3-0-3)
MAT	7076	Plasma Theory-I	(3-0-3)
MAT	7077	Plasma Theory-II	(3-0-3)
MAT	7078	Mathematical Techniques for Boundary Value Problem	(3-0-3)
MAT	8071	Modeling & Simulation	(3-0-3)
MAT	8072	Advanced Operation Research	(3-0-3)
MAT	8073	Mathematical Modeling-I	(3-0-3)
MAT	8074	Mathematical Modeling-II	(3-0-3)
MAT	7079	Advanced Differential Equations	(3-0-3)
MAT	7080	Theory of Difference Equations	(3-0-3)
MAT	7081	Advanced Topics in Dynamical Systems	(3-0-3)
MAT	6073	General Relativity-I	(3-0-3)
MAT	6074	General Relativity-II	(3-0-3)
MAT	8090	*Topics in Applied Mathematics	(3-0-3)
MAT	6091	Lecture Series on Computer Tools for Mathematics	(3-0-3)
MAT	6092	Research Methodology	(1-0-1)
MAT	6099	MPhil Dissertation	(6-0-6)
UR	711	Ethics in Practice I	(1-0-1)
UR	721	Ethics in Practice II	(1-0-1)

Note: Two additional credit hours (Ethics shall be mandatory for all students as well).

PhD Mathematics

The admission to PhD Program will be made as per rules and regulations of RIPHAH International University, Islamabad and on HEC criteria for PhD Program.

Eligibility Criteria

The following criteria will be adopted for the admission to PhD (mathematics) program.

1. M.Phil/M.S./B.S. Mathematics degree or equivalent degree holders can apply for PhD (Mathematics) admission.
   - CGPA 3/4.00
2. 70% score in Ph.D. admission test conducted by the department or GRE passed conducted by ETS.
3. The PhD student shall complete coursework of 48 credit hours, however, MS/MPhil or equivalent degree holders having 24 credit hours coursework will be eligible to avail exemption of 24 credit hours coursework.
4. The student will be required to submit a statement of purpose along with application form.

Selection Criteria:

Academic Career	60%
Interview	40%

Consent of a supervisor from the department for research

Class Timings:

Saturday	2:00 pm - 8:00 pm
Sunday	8:00 am - 7:00 pm

Duration:

Minimum 3 years & Maximum 8 years

Semester-1

	Title	LT	LB	CR
MAT xxx	Elective I	3	0	3
MAT xxx	Elective II	3	0	3
MAT xxx	Elective III	3	0	3
MAT xxx	Elective IV	3	0	3
Sub-Total				**12**

Semester-2

	Title	LT	LB	CR
MAT xxx	Elective V	3	0	3
MAT xxx	Elective VI	3	0	3
MAT xxx	Elective VII	3	0	3
MAT xxx	Elective VIII	3	0	3
Sub-Total				**12**

List of PhD Course

Following is the complete list of courses offered by the Department of Basic Sciences.

Code	Course Title	Cr. Hours
MAT 6001	Topological Vector Spaces	(3-0-3)
MAT 7001	Advanced Functional Analysis	(3-0-3)
MAT 6002	Algebraic Topology	(3-0-3)
MAT 7002	Theory of Complex Variables	(3-0-3)
MAT 7003	Fixed Point Theory and Applications-I	(3-0-3)
MAT 7004	Fixed Point Theory and Applications-II	(3-0-3)
MAT 6003	Approximation Theory & Applications	(3-0-3)
MAT 6004	Field Extensions & Galois Theory	(3-0-3)
MAT 6005	Algebraic Number Theory	(3-0-3)
MAT 7005	Measure Theory	(3-0-3)
MAT 7006	Fourier Analysis	(3-0-3)
MAT 7007	Semigroup Theory	(3-0-3)

Code	Course Title	Cr. Hours
MAT 7008	LA-Semigroups	(3-0-3)
MAT 7009	Advanced Ring Theory-I	(3-0-3)
MAT 7010	Advanced Ring Theory-II	(3-0-3)
MAT 6006	Theory of Group Actions	(3-0-3)
MAT 6007	Theory of Group Graphs	(3-0-3)
MAT 7011	Rough set theory and its Applications	(3-0-3)
MAT 7012	Fuzzy Logic and Algebra	(3-0-3)
MAT 7013	Advanced Graph Theory	(3-0-3)
MAT 7014	Theory of Function Spaces	(3-0-3)
MAT 7015	Harmonic Analysis	(3-0-3)
MAT 7016	Advanced Real Analysis	(3-0-3)
MAT 7017	Spectral Graph Theory	(3-0-3)

Code	Course Title	Cr. Hours
MAT 6008	Advanced Category Theory	(3-0-3)
MAT 6009	Theory of Locales	(3-0-3)
MAT 7018	Topological Indices of Chemical Graphs	(3-0-3)
MAT 7019	Young Tableaux with Applications	(3-0-3)
MAT 6010	ADVANCED RIEMANNIAN GEOMETRY	(3-0-3)
MAT 6011	Knots Theory with Applications	(3-0-3)
MAT 6012	Fuzzy Logic and its Applications	(3-0-3)
MAT 8030	*Topics in Pure Mathematics	(3-0-3)
MAT 6041	Analysis of Algorithms	(3-0-3)
MAT 6042	Advanced Optimization Theory	(3-0-3)
MAT 7041	Advanced Numerical Analysis	(3-0-3)
MAT 7042	Numerical Solution of Partial Differential Equations	(3-0-3)
MAT 6043	Advanced Integral Equations	(3-0-3)
MAT 7043	Integral Inequalities	(3-0-3)
MAT 6044	Theory of Splines	(3-0-3)
MAT 6045	FEM for Partial Differential Equations	(3-0-3)
MAT 7044	Computational Fluid Dynamics	(3-0-3)
MAT 7045	Mathematical Methods in Biomathematics	(3-0-3)
MAT 7046	Fuzzy Differential Equations	(3-0-3)
MAT 8041	Advanced Finite Element Analysis	(3-0-3)
MAT 8042	Financial Mathematics I	(3-0-3)
MAT 8043	Financial Mathematics II	(3-0-3)
MAT 8044	Stochastic Calculus I	(3-0-3)
MAT 8045	Stochastic Calculus II	(3-0-3)
MAT 7047	Advanced Topics in Numerical Analysis	(3-0-3)

Code	Course Title	Cr. Hours
MAT 7048	Enumerative Combinatorics	(3-0-3)
MAT 8060	*Topics in Computation Mathematics	(3-0-3)
MAT 7071	Symmetries and Exact Solutions of Differential Equations	(3-0-3)
MAT 7072	Mathematical Analysis of Heat Transfer	(3-0-3)
MAT 7073	Advanced Analytical Dynamics	(3-0-3)
MAT 7074	Perturbation Methods	(3-0-3)
MAT 7075	Non-Newtonian Fluid Mechanics	(3-0-3)
MAT 6071	Advanced Partial Differential Equations	(3-0-3)
MAT 7076	Plasma Theory-I	(3-0-3)
MAT 7077	Plasma Theory-II	(3-0-3)
MAT 7078	Mathematical Techniques for Boundary Value Problem	(3-0-3)
MAT 8071	Modeling & Simulation	(3-0-3)
MAT 8072	Advanced Operation Research	(3-0-3)
MAT 8073	Mathematical Modeling-I	(3-0-3)
MAT 8074	Mathematical Modeling-II	(3-0-3)
MAT 7079	Advanced Differential Equations	(3-0-3)
MAT 7080	Theory of Difference Equations	(3-0-3)
MAT 7081	Advanced Topics in Dynamical Systems	(3-0-3)
MAT 6073	GENERAL RELATIVITY-I	(3-0-3)
MAT 6074	GENERAL RELATIVITY-II	(3-0-3)
MAT 8090	*Topics in Applied Mathematics	(3-0-3)
MAT 6091	Lecture Series on Computer Tools for Mathematics	(1-0-1)
MAT 6092	Research Methodology	(1-0-1)
MAT 8099	PhD. Thesis	(0-030)

MPhil / PhD Statistics

Degree Requirement

MPhil Statistics program will contain 32 credit hours out of which 26 will comprise of course work in the first two semesters and two semesters will be for dissertation equivalent to 6 credit hours.

PhD Statistics will contain 48 credit hours out of which 24 will comprise of course work in the first two semesters and research work will be for dissertation equivalent to 30 credit hours. The courses will be offered from the following in MPhil & PhD:

Eligibility Criteria MPhil

- 16 years of education in the relevant field from a recognized institution with minimum 50% marks

  OR

- CGPA 2.0/4.00

Duration MPhil

Minimun 2 years & Maximum 4 years

Selection Criteria MPhil

UAT/GAT General Test: Passed
Academic Career 60%
Interview 40%

Class Timings

Saturday	2:00 pm - 8:00 pm
Sunday	8:00 am - 7:00 pm

Duration PhD

Minimum 3 years & Maximum 8 years

Eligibility Criteria PhD

The following criteria will be adopted for the admission to PhD (mathematics) program.

1. M.Phil/M.S./B.S. Mathematics degree or equivalent degree holders can apply for PhD (Mathematics) admission.
   - CGPA 3/4.00
2. 70% score in Ph.D. admission test conducted by the department or GRE passed conducted by ETS.
3. The PhD student shall complete coursework of 48 credit hours, however, MS/MPhil or equivalent degree holders having 24 credit hours coursework will be eligible to avail exemption of 24 credit hours coursework.
4. The student will be required to submit a statement of purpose along with application form.

Selection Criteria PhD

Academic Career	60%
Interview	40%

Consent of a supervisor from the department for research on the basis of statement of purpose submitted.

Code	Course Title
STS 7061	Survival Data Analysis
STS 7012	Randomized Response
STS 7071	Non- Linear Time Series Modeling & Forecasting
STS 7072	Acceptance Sampling
STS 6099	MPhil Dissertation

List of MPhil Courses:

Code	Course Title
STS 7001	Statistical Inference
STS 7002	Advanced Probability Theory
STS 7003	Generalized Linear Models
STS 7004	Bayesian Inference
STS 7005	Multivariate Analysis
STS 7006	Time Series and Forecasting
STS 7007	Categorical Data Analysis
STS 7008	Applied Stochastic Models
STS 7011	Advanced Sampling Techniques
STS 7021	Incomplete Block Design
STS 7022	Factorial Experiments
STS 7031	Advanced Regression Analysis
STS 7041	Bayesian Decision Theory
STS 7051	Statistical Process Control
STS 7032	Applied Logistic Regression
STS 7042	Operations Research
STS 7052	Population Analysis

List of PhD Courses:

Code	Course Title
STS 8001	Mathematical Demography
STS 8002	Medical Statistics and Analysis of Clinical Trails
STS 8003	Non-Linear Estimation
STS 8004	Numerical Analysis and Stochastic Simulation
STS 8005	Recent Developments in Statistics
STS 8006	Robust Methods
STS 8007	Mixture Distributions
STS 8099	PhD. Thesis

* A student can register course(s) in other disciplines with the permission of Discipline Incharge/ chairperson of Department.

Detector
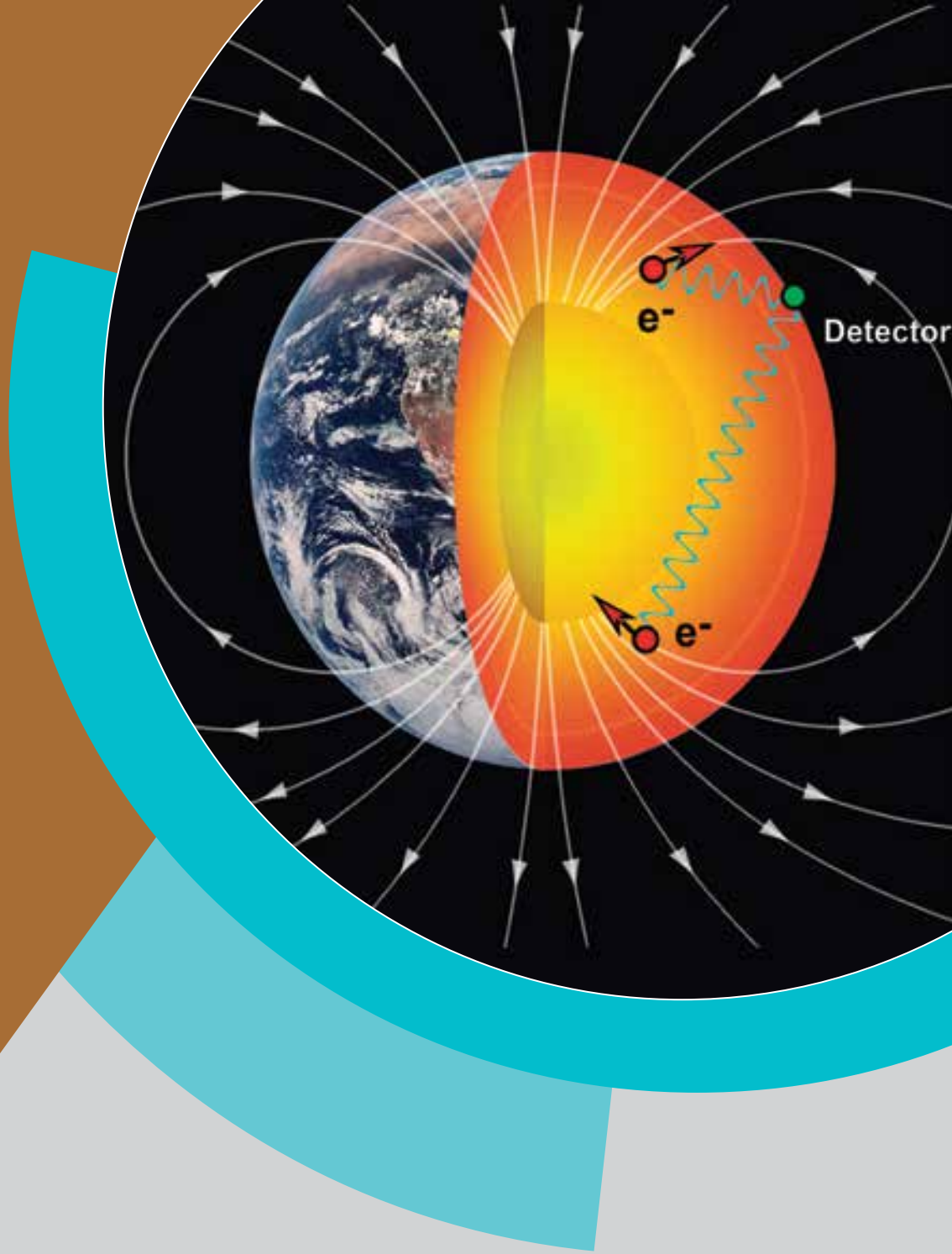
Department of
Physics

Faculty of Department of Physics

Department of
PHYSICS

Physics is a broad and highly developed subject today. Physics builds fundamental knowledge required for future developments in technology and it has a vital role in other fields like engineering, chemistry, medical science, environmental science and computer science.

Department of physics aims to pursue excellence in physics through teaching and research. It is our goal to provide the best teaching as well as research facilities to our students. Faculty members of the department are committed for quality teaching and to improve critical thinking of students about science. The department diversifies its programs in order to deal with multifaceted requirements of the country.

Physics department offers admission in BS Physics, MSc Physics, MPhil Physics and PhD Physics levels. These programs offer students the opportunity to begin with BS physics and end their education till PhD level. In order to promote research culture various research groups have been formed in the department. Faculty members are actively engaged in advanced research across the different fields of physics like materials sciences, condensed matter physics, high energy physics, atomic and molecular physics, computational physics and plasma physics.

In order to keep our students updated with present and ongoing advancements in physics, the department arranges seminars and workshops. These activities not only enhance knowledge of students about current developments in physics but it also offers opportunities to nourish their communication and presentation skills.

On behalf of physics faculty, I welcome you to the Department of Physics, Faculty of Engineering and Applied Sciences Riphah International University Islamabad.

Dr. M. Farooq Nasir
Associate Professor, HOD

Faculty of
PHYSICS DEPARTMENT

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BS Physics

The Department of Physics came into being under the umbrella of Faculty of Engineering and Applied Sciences (FEAS) at Riphah International University Islamabad. It aims to impart quality education at undergraduate and graduate level, thereby producing qualified graduates to cater for societal needs in the country and abroad. The Department is presently offering BS, MSc, M. Phil and PhD Physics programs. The curricula and syllabi of all offered programs are well-planned and designed according to recommendations and guidelines of Higher Education Commission (HEC) of Pakistan. Keeping in view the market demands the department launched 4 years BS-Physics Program in Fall-2018 semester. The academic curricula and necessary resources have already been established. The department not only provides a conducive environment but also organise extra and co-curricular activities for students.

Eligibility Criteria

The students would be able to apply if they fulfill the following criteria for admission in BS Physics program;

1. Intermediate securing at least 45% marks in aggregate.
2. Any other examination of a Foreign University / Institution / Examining Body, equivalent to intermediate. Equivalence and percentage of marks will be determined by IBCC.
3. Diploma of Associate Engineers Examination, securing at least 60% marks in aggregate

Duration:

Four years program spread over 8 semesters.

Admission Criteria:

The admission in Riphah International University is strictly based on merit. The University is open to all persons irrespective of applicant's gender, religion, race, creed, color or domicile. Admission shall be granted on the basis of eligibility criteria of the University. The following admission criteria would be followed for the fresh students. The final admission will be made purely on the basis of cumulative merit:

Academic Qualification	60%
Interview/Entry Test	40%

Intake:

Fall & Spring

Credit Hours Breakup of Courses

Credit hours are mentioned using the following notation (Theory credit hours, Lab credit hours) Total credit hours

Domain	Number of Courses	Number of Credit Hours
Compulsory courses	37	96
General courses	11	20
Elective Courses/ Projects	4	18
Total	**52**	**134**

Course and Credit Hour Requirements

The BS Physics program spans over a time period of four years (eight semesters) and comprises 131 credit hours. It includes compulsory and elective courses along with research project in the final year.

Career in Physics

Physics, being the key fields of sciences, deals with the core concepts of physics as well as their application in different fields. It is a diversified field which gives birth to many other disciplines over the decades, such as Electronics, Material Sciences and Engineering etc.

The main objective of the launch of BS program is to effectively equip the students with a solid foundation in core areas of Physics, so that they can pursue their higher education in their desired interest areas. The combination of high quality curriculum, highly qualified faculty, well-equipped laboratories and all available necessities at the Department give exposure to leading-edge technologies. These facilities open up new avenues for substantial contribution of graduates in respective industries and research organizations such as PIEAS, PAEC, KRL, SUPARCO and Meteorology.

Teaching and Research Faculty

The Department of Physics holds highly qualified, motivated and professionally competent faculty who not only excels in their respective areas of specialization but also keep themselves abreast of recent developments in their respective areas of research.

Awards for Students

1. A student obtaining overall first position in the batch shall be awarded a Certificate of Merit and Zulfiqar Gold Medal.
2. Chancellor's medal is given to students with top class academic performance.

Fees & Other Charges

Each student shall be required to pay tuition fee and other charges as may be determined by the finance department and approved by the University from time to time. However installment plan may be approved by the respective program in charges and department heads.

Academic Calendar

Academic year at Riphah International University comprises two regular semesters and a summer semester. Regular semesters comprise of 16 weeks of teaching and two weeks of examinations. Summer semester is a concentrated period of study comprising eight weeks. The schedule of the semesters for academic year 2020-2021 is as follows:

Fall: September-2021 to February 2022

Spring: February 2022 to June- 2022

Summer: July 2022 to August 2022

Students Evaluations

Students are evaluated as per

1. Quizzes
2. Home Assignments
3. Mid-term exams
4. Projects
5. Practical/Lab test
6. Viva Voce
7. End-Term Examination

Students Services

Student services department at Riphah offers a variety of services to the students. It is responsible for all co-curricular and extra-curricular activities within and outside the University campus. It provides students with opportunities to exploit their potential in various sports and socio cultural activities. The department is committed to address all issues in amicable way.

Library

The Library is situated in I-14 campus of Riphah International University. The aim of the Library is to provide access to materials and information resources which will help the students in their studies and learning. All new students are offered an orientation tour of the Library and its facilities. Expert and helpful staffs are on hand to assist and facilitate the students.

Semester-1

Course Code	Course Title	Cr. Hours
HU 1001	Functional English-I	(3,0)3
MAT 1055	Basic Mathematics	(4,0)4
CS 1001	Introduction to computer	(3,0)3
PHY 1001	Mechanics-I	(3,0)3
HU 1002	Pakistan Culture and Society	(2,0)2
HU 1003	Islamic Studies	(2,0)2
PHY(L) 1001	Lab I- Mechanics	(0,1)1
Total Credits		**(17,1)18**

Semester-2

Course Code	Course Title	Cr. Hours
HU 1004	Functional English-II	(3,0)3
MAT 1001	Calculus-I	(3,0)3
MS 2001	Introduction to Management	(3,0)3
PHY 1002	Electricity & Magnetism	(4,0)4
HU 1005	Introduction to Logic & Philosophy	(0,1)1
PHY 1101	Mechanics-II	(3,0)3
PHY(L) 1002	Lab II- Electricity and Magnetism	(0,1)1
Total Credits		**(18,1)18**

Semester-3

Course Code	Course Title	Cr. Hours
HU 2001	Communication Skills	(3,0)3
MAT 1003	Calculus-II	(3,0)3
PHY 2101	Waves & Oscillations	(3,0)3
PHY 2001	Heat and Thermodynamics	(4,0)4
PHY 2002	Modern Physics	(4,0)4
PHY(L) 2001	Lab III- Waves and Oscillations	(0,1)1
Total Credits		**(17,1)18**

Semester-4

Course Code	Course Title	Cr. Hours
MAT 1051	Introduction to linear Algebra	(3,0)3
MAT 2051	Elementary Differential Equations	(3,0)3
STS 2051	Probability & Statistics	(3,0)3
PHY 2102	Optics	(3,0)3
PHY2003	Circuit Theory & Analysis	(3,0)3
PHY(L) 2002	Lab IV- Optics	(0,1)1
Total Credits		**(15,1)16**

Semester-5

Course Code	Course Title	Cr. Hours
PHY 3101	Mathematical Methods of Physics-I	(3,0)3
PHY 3102	Electromagnetic Theory-I	(3,0)3
PHY 3001	Electronics-I	(3,0)3
PHY 3103	Classical Mechanics	(3,0)3
PHY(L) 3001	Lab-V Electronics	(0,2)2
HU 3001	Islamic Ethical Principles & Contemporary Issues	(1,0)1
Total Credits		**(13,2)15**

Semester-6

Course Code	Course Title	Cr. Hours
PHY 3104	Mathematical Methods of Physics-II	(3,0)3
PHY 3105	Quantum Mechanics-I	(3,0)3
PHY 3106	Electronics-II	(3,0)3
PHY 3107	Electromagnetic Theory-II	(3,0)3
PHY(L) 3002	Lab-VI Modern Physics	(0,2)2
HU 3002	Personality Development	(1,0)1
Total Credits		**(13,2)15**

Semester-7

Course Code	Course Title	Cr. Hours
PHY 4101	Quantum Mechanics-II	(3,0)3
PHY 4102	Atomic & Molecular Physics	(3,0)3
PHY 4001	Solid State Physics-I	(3,0)3
PHY 4103	Nuclear Physics	(3,0)3
PHY(L) 4001	Lab-VII Spectroscopy	(0,2)2
HU 4001	Professional Ethics-I	(1,0)1
PHY xxxx	Elective/Project	(3,0)3
Total Credits		**(16,2)18**

Semester-8

Course Code	Course Title	Cr. Hours
PHY 4104	Statistical Physics	(3,0)3
PHY 4105	Solid State Physics-II	(3,0)3
HU 4002	Professional Ethics-II	(1,0)1
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective/Project	(3,0)3
Total Credits		**(16,0)16**

Total Credit Hours: 134

Elective Courses for BS Physics Program

Sr. No	Elective Courses	Course Code
1.	Project Report	PHY 4099
2.	Introduction to Materials Science	PHY 4002
3.	Introduction to Nanoscience and Nanotechnologies	PHY 4003
4.	Particle Physics	PHY 4004
5.	Plasma Physics	PHY 4005
6.	Laser Physics	PHY 4006
7.	Electronic Materials and Devices	PHY 4007
8.	Introduction to Photonics	PHY 4008
9.	Environmental Physics	PHY 4009
10.	Fluid Dynamics	PHY 4010
11.	Renewable Sources of Energy	PHY 4011
12.	Quantum Information Theory	PHY 4012
13.	Computer Simulations in Physics	PHY 4013
14.	Surface Physics	PHY 4014
15.	Computational Physics	PHY 4015
16.	Laser Engineering	PHY 4016
17.	Nanoscale Magnetism	PHY 4017
18.	Digital Electronics	PHY 4018
19.	Nanomaterials and Applications	PHY 4019
20.	Physics at Nanoscale	PHY 4020
21.	Methods of Experimental Physics	PHY 4021
22.	Introduction to Quantum Computing	PHY 4022
23.	Nanoscience and Technology	PHY 4023
24.	Material Science	PHY 4024

Laboratory Courses in 4 Years BS Physics Program

Students will take seven laboratory courses, Lab-I through Lab VI. Labs I, II, III and IV are one credit hour each while Labs V, VI and VII are two credit hours. One-credit hour laboratory entails at least three hours of practical work each week during the semester and a two-credit hour laboratory requires at least six hours of practical work each week.

Code	Course	Semester	Cr. Hrs.	Themes
PHY(L) 1001	Lab-I	1	1	• Measurement and uncertainties • Mechanics, fluids
PHY(L) 1002	Lab-II	2	1	• Measurement and uncertainties • Electricity and Magnetism
PHY(L) 2001	Lab-III	3	1	• Heat, waves, sound
PHY(L) 2002	Lab-IV	4	1	• Optics
PHY(L) 3001	Lab-V	5	2	• Electronics
PHY(L) 3002	Lab-VI	6	2	• Modern Physics • Advanced optics, atomic physics
PHY(L) 4001	Lab-VII	7	2	• Spectroscopy

BS Physics (Weekend)

for B.Sc. and ADP-Science Degree Holders

The Department of Physics, Riphah International University, Islamabad offers under graduate of Bachelor of Science (BS Weekend) in Physics. The diversity of undergraduate courses offered in the department equips the students to pursue higher studies in Physics.

Eligibility Criteria

BSc securing at least 45% marks in aggregate.
Or ADP with 50% marks in aggregate.

Intake:

Fall & Spring

Selection Criteria:

Academic Career	60%
Interview/Entry Test	40%

Class Timings:

Friday	4:00pm-8:00pm
Saturday	2:00pm-8:00pm
Sunday	8:00am-8:00pm

Duration:

For B.Sc. degree holder:	2.5 Years
For ADP holder:	2 years

• **Entry point for B.Sc. Degree Holders:**
The student may be admitted in 5th semester. However, he/she shall need to complete 71 credit hours courses out of which 15-18 credit hours of courses will be from the list of Compulsory courses.

• **Entry point for Associate Degree of Science ADP-Science(2 years) Holders:**
The student may be admitted in 5th semester without doing any deficiency courses.

Semester-1

Course Code	Course Title	Cr. Hours
PHY 3101	Mathematical Methods of Physics-I	(3,0)3
PHY 3102	Electromagnetic Theory-I	(3,0)3
PHY 3001	Electronics-I	(3,0)3
PHY 3103	Classical Mechanics	(3,0)3
PHY(L) 3001	Lab-V Electronics	(0,2)2
HU 3001	Islamic Ethical Principles and Contemporary Issues	(1,0)1
	Total Credits	**(13,2)15**

Semester-2

Course Code	Course Title	Cr. Hours
PHY 3104	Mathematical Methods of Physics-II	(3,0)3
PHY 3105	Quantum Mechanics-I	(3,0)3
PHY 3106	Electronics-II	(3,0)3
PHY 3107	Electromagnetic Theory-II	(3,0)3
PHY(L) 3002	Lab-VI Modern Physics	(0,2)2
HU 3002	Personality Development	(1,0)1
	Total Credits	**(13,2)15**

Semester-3

Course Code	Course Title	Cr. Hours
PHY 4101	Quantum Mechanics-II	(3,0)3
PHY 4102	Atomic & Molecular Physics	(3,0)3
PHY 4001	Solid State Physics-I	(3,0)3
PHY 4103	Nuclear Physics	(3,0)3
PHY(L) 4001	Lab-VII Spectroscopy	(0,2)2
HU 4001	Professional Ethics-I	(1,0)1
PHY xxxx	Elective/Project	(3,0)3
	Total Credits	**(16,2)18**

Semester-4

Course Code	Course Title	Cr. Hours
PHY 4104	Statistical Physics	(3,0)3
PHY 4105	Solid State Physics-II	(3,0)3
HU 4002	Professional Ethics-II	(1,0)1
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective/Project	(3,0)3
	Total Credits	**(16,0)16**

MPhil. / PhD Physics

The Department of Basic Sciences (DBS), Riphah International University, Islamabad offers graduate programs leading to the degree of MPhil (Master of Philosophy) in Physics.

Objectives are to develop critical skills necessary for solving unknown problems from our physical surroundings. To develop the capability of analyzing, addressing and posing solutions to problems of natural importance and to install a deep appreciation of the need for optimum utilization of natural resources and environment. To instill in students the habit of independent thinking, deep inquiry and motivation for self-education. To sharpen our students' mathematical power making them capable of modeling, analyzing and predicting the behavior of physical processes.

To provide an in-depth understanding of some specialized areas of physics through the option of elective courses. To equip students with the necessary skill set for pursing area of physics education, research and industry in government or private organizations. The Student will have opportunity to join research organization as well teaching position in universities and schools. They will have opportunity to continue their research in local or foreign university. The student will involve in policy making for advance research. They will be able to conduct post-doctoral research in local and foreign universities. Further they publish their research work as patents at local or international level.

The MPhil program spans over two years (four semesters) while PhD program spans over three years (six semesters). The semester-wise breakup of curriculum is given on subsequent pages.

Programme	Course work credit hours	Dissertation/ Thesis credit hours	Total
MPhil.	26	6	32
PhD	24	30	54

Eligibility Criteria MPhil

- 16 years of education in the relevant field from a recognized institution with minimum 60% marks

    OR

- CGPA 2.0/4.00
- GAT (General) / UAT (General) with 60% score

Duration MPhil

Minimun 2 years & Maximum 4 years

Selection Criteria MPhil

GAT (General) / UAT (General) with 60% score

Eligibility Criteria PhD

The following criteria will be adopted for the admission to PhD (mathematics) program.

1. M.Phil/M.S./B.S. Mathematics degree or equivalent degree holders can apply for PhD (Mathematics) admission.
    - CGPA 3/4.00
2. 70% score in Ph.D. admission test conducted by the department or GRE passed conducted by ETS.
3. The PhD student shall complete coursework of 48 credit hours, however, MS/MPhil or equivalent degree holders having 24 credit hours coursework will be eligible to avail exemption of 24 credit hours coursework.
4. The student will be required to submit a statement of purpose along with application form.

Duration PhD

Minimum 3 years & Maximum 8 years

Selection Criteria PhD

Academic Career   60%
Interview   40%
Consent of a supervisor from the department for research on the basis of statement of purpose submitted.

Class Timings:

Timings are adjusted as per requirement of students.

Code	Course Title	Cr. Hours	Code	Course Title	Cr. Hours
	Compulsory Courses		PHY 6030	Advanced Functional Materials	PHY 6030
PHY 6001	Advanced Mathematical Methods for Physics	3	PHY 6031	Semiconductor Physics	PHY 6031
PHY 6002	Advanced Electrodynamics	3	PHY 6032	Condensed Matter Theory-I	PHY 6032
PHY6003	Advanced Quantum Mechanics	3	PHY 6033	Condensed Matter Theory-II	PHY 6033
PHY6004	Advanced Statistical Physics	3	PHY 6034	Optical Properties of Solids	PHY 6034
HU 6001	Ethics in Practice-I*	1	PHY 6035	Magnetism in Condensed Matter	PHY 6035
HU 6002	Ethics in Practice-II*	1	PHY 6036	Density Functional Theory	PHY 6036
	Elective Courses		PHY 6037	Nano-magnetism	PHY 6037
PHY 6011	Magnetism and Magnetic Materials	PHY 6011	PHY 7001	High Energy Physics	PHY 7001
PHY 6012	Nano Materials	PHY 6012	PHY 7002	Quantum Optics	PHY 7002
PHY 6013	Advanced Solid State Electronic Devices	PHY 6013	PHY 7003	Heavy Ion Physics	PHY 7003
PHY 6014	Advanced Plasma Physics	PHY 6014	PHY 7004	Advanced Computational Physics	PHY 7004
PHY 6015	Particle Physics Phenomenology	PHY 6015	PHY 7005	Industrial Plasma Physics	PHY 7005
PHY 6016	Materials Science	PHY 6016	PHY 7006	Standard Model	3
PHY 6017	Materials Characterization Techniques	PHY 6017	PHY 7007	Neutrino Physics	3
PHY 6018	Physics of Superconductors	PHY 6018	PHY 7008	Principle, method and applications of nuclear tracks	3
PHY 6019	Surface Physics	PHY 6019	PHY 7009	Cosmology	3
PHY 6020	Experimental Techniques in Physics	PHY 6020	PHY 7010	Advanced Topics in Super conductivity	3
PHY 6021	Lasers and Optics	PHY 6021	PHY 7011	Quantum Field Theory	3
PHY 6022	Nanotechnology and Nanomaterials	PHY 6022	PHY 7012	Parallel Programming Model	3
PHY 6023	Vacuum Science & Technology	PHY 6023	PHY 7013	Advanced Biomedical Image Processing	3
PHY 6024	Environmental Radiation Protection	PHY 6024	PHY 7014	Advanced Topics in Materials Science	3
PHY 6025	Physics of Thin Films	PHY 6025		**Research Work**	
PHY 6026	Accelerator Physics	PHY 6026	PHY 6099	MPhil Research Dissertation	6
PHY 6027	Particle Detectors	PHY 6027	PHY 7099	Ph.D. Research Thesis	30
PHY 6028	Environmental Physics	PHY 6028			
PHY 6029	Medical Physics	PHY 6029			

Note: Two additional credit hours (Ethics shall be mandatory for all students as well).

IMPACT FACTOR PUBLICATION DETAILS, JANUARY 2020-MARCH 2021

Departments of Mathematics & Statistics

Sr. No	Name of Riphah's Author	Publication Title	Journal Name	ISSN	Category	Impact Factor	Vol (Iss No.)	Pg No.
1	Abbas Ali	Another View on Intuitionistic Fuzzy Preference Relation Based Aggregation Operators and Their Applications	Artificial Intelligence Review	0269-2821	W	5.747	59	18-05-2020
2	Abbas Ali	Soft dominance based multigranulation decision theoretic rough sets and their applications in conflict problems	Soft Computing	1432-7643	W	3.05	24	12357–12360
3	Abbas Ali	Note on Fuzzy multi-granulation decision-theoretic rough sets basedon fuzzy preference relation	Journal of Intelligent & Fuzzy Systems	1064-1246	W	1.851	39	43–52
4	Abbas Ali	Labor-management negotiation conflict analysis based on soft preference relation	Journal of Intelligent & Fuzzy Systems	1064-1246	W	1.851	39	81–105
5	Abbas Ali	Soft ordered based multi-granulation rough sets and incomplete information system	Journal of Intelligent & Fuzzy Systems	1064-1246	W	1.851	38	1637–1647
6	Abbas Ali	Uncertainty measure of Z-soft covering rough models based on a knowledge granulation	Alexenderia Engineering Journal	1110-0168	W	2.46	2020(59)	1629–1636
7	Mudassir Shams	Derivative free iterative simultaneous method for finding distinct roots of polynomial equation	Mathematical Problemes in Engineering	1024-123X, 1563-5147	W	1.09	2020	20 pages
8	Mudassir Shams	Study of dynamical behavior and stability of iterative methods for nonlinear equation with applications in engineering	Mathematical Problemes in Engineering	1024-123X, 1563-5147	W	1.09	2020	17 pages
9	Mudassir Shams	On dynamics of iterative techniques for nonlinear equation with applications in engineering	Computers, Materials & Continua	1546-2218, 1546-2226	W	4.89	66	275-290
10	Mudassir Shams	Computer Methodologies for the Comparison of Some Efficient Derivative Free Simultaneous Iterative Methods for Finding Roots of Non-Linear Equations	Computer Systems Science & Engineering	0267-6192	W	0.278	36(3)	493-507
11	Mudassir Shams	On Computer Implementation for Comparison of Inverse Numerical Schemes for Non-Linear Equations	Journal of MATHEMATICS	2314-4785, 2314-4629	W	0.712	2020	2021
12	Mudassir Shams	Inverse Numerical Iterative Technique for Finding all Roots of Nonlinear Equations with Engineering Applications						
13	Dr. Naveed Yaqoob	N-version of the neutrosophic cubic set: application in the negative influences of Internet	The Journal of Supercomputing	1573-0484 0920-8542	W	2.469	Accepted (In Press)	
14	Dr. Naveed Yaqoob	Left and right magnifying elements in some generalized partial transformation semigroups	Communications in Algebra	0092-7872 1532-4125	W	0.55	Accepted (In Press)	
15	Dr. Naveed Yaqoob	Topological structures of lower and upper rough subsets in a hyperring	Journal of Mathematics	2314-4785 2314-4629	Y	0.712	Article ID 9963623	6 Pages
16	Dr. Naveed Yaqoob	Extension of TOPSIS method for group decision-making under triangular linguistic neutrosophic cubic sets	Soft Computing	1432-7643 1433-7479	W	3.05	25 (5)	3359-3376
17	Dr. Naveed Yaqoob	A novel investigation on fuzzy hyperideals in ordered *-semihypergroups	Computational and Applied Mathematics	1807-0302 2238-3603	Y	1.36	40(2)	24 Pages
18	Dr. Naveed Yaqoob	Complex bipolar fuzzy sets: An application in a transport's company	Journal of Intelligent and Fuzzy Systems	1875-8967 1064-1246	W	1.851	40 (3)	3981-3997
19	Dr. Naveed Yaqoob	Maclaurin symmetric mean aggregation operators based on cubic Pythagorean linguistic fuzzy number	Journal of Ambient Intelligence and Humanized Computing	1868-5145 1868-5137	W	4.594	12(2)	1925-1942
20	Dr. Naveed Yaqoob	T-norms and T-conorms hesitant fuzzy Einstein aggregation operator and its application to decision making	Soft Computing	1432-7643 1433-7479	W	3.05	25(1)	47-71
21	Dr. Naveed Yaqoob	Detection and severity of tumor cells by graded decision-making methods under fuzzy N-soft model	Journal of Intelligent and Fuzzy Systems	1875-8967 1064-1246	W	1.851	9(1)	1303-1318
22	Dr. Naveed Yaqoob	Extensions of Dombi aggregation operators for decision-making under m-polar fuzzy information	Journal of Mathematics	2314-4785 2314-4629	Y	0.71	Article ID 4739567	20 Pages
23	Dr. Naveed Yaqoob	Design of S-control chart for neutrosophic data: An application to manufacturing industry	Journal of Intelligent and Fuzzy Systems	1875-8967 1064-1246	W	1.851	38	4743–4751
24	Ms. Sadia Nadir	NGO online disclosures index in the presence of auxiliary information	PLOS One	1932-6203	W	2.74	15	e0238297
25	Abdullah Shoaib	Fixed points results for F-μs -ρ*s contraction in quasi b-metric spaces with some application	Dynamic system and application	1056-2176	W	0.522	30	157-183
26	Abdullah Shoaib	Solutions of Integral Equations via Fixed-Point Results on Orthogonal Gauge Structure	Mathematical problems in Engineering	1024-123X	W	1.009	2021	11-Jan

Sr. No	Name of Riphah's Author	Publication Title	Journal Name	ISSN	Category	Impact Factor	Vol (Iss No.)	Pg No.
27	Abdullah Shoaib	Fixed point result in double controlled quasi metric type spaces	AIMS Mathematics	2473-6988			6	
28	Abdullah Shoaib	Fixed point results for a pair of multivlaued mappings in quasi metric spaces via new approach			W	0.882		1851-1864
29	Abdullah Shoaib	On fixed point result for α*-ψ- Dominated fuzzy contactive mappings with graph						627-638
30	Abdullah Shoaib	Some fixed point results for multivalued mappings in b- multiplication and b-metric space	University Politehnica of Bucharest Scientific Bulletin-Series A-Applied Mathematics and Physics	1223-7027	W	0.619	82	
31	Abdullah Shoaib	Fixed point for a generalized F- contrative mapping on clossed ball with application						3093-3103
32	Abdullah Shoaib	Common fixed points for generalized (α– ψ)-Meir -keeler- khan mappings in metric spaces	Journal of Intelligent & fuzzy Systems	1064-1246	W	1.851	38	439-447
33	Abdullah Shoaib	Fixed point result for dominated mappings in rectangular b-metric spaces with application						177-184
34	Abdullah Shoaib	Double Controlled Dislocated Quasi metric type spaces and some result	International Journal of Analysis and application	2291-8639	X		18	14-Jan
35	Abdullah Shoaib	Double Controlled Quasi Metric type spaces and some results						5221-5229
36	Abdullah Shoaib	Common fixed point for generalized contraction in b-metric multiplication metric spaces with application	Mathematical Sciences			0.945		8-Jan
37	Abdullah Shoaib	Unique Fixed-Point Results for β-Admissible Mapping under (β-ψ ˘)- Contraction in Complete Dislocated Gd-Metric Space		2251-7456	W		2020	8-Jan
38	Abdullah Shoaib	Cyclic b-multiplicative (A,B)-Hardy- Rogers-type local contraction and related in b-multiplicative and b- metric spaces	The Journal Analysis	2367-2501	Y		2020	
39	Abdullah Shoaib	Some fixed points of α– ψ–K- Contractive mappings in partial metric spaces	AIMS Mathematics	2473-6988	W	0.882	5	46-59
40	Abdullah Shoaib	Common Fixed point of multivlaued mapping in ordered dislocated quasi G-metric spaces	Journal of Mathematics	2314-4629	W	0.712	2020	13-Jan
41	Abdullah Shoaib	Multivalued fixed point results for two families of mappings in modular-like metric space with application	Complexity	1076-2787	W	2.462	2020	
42	Abdullah Shoaib	Some fixed point result in b- multiplicative metric space	Bulletin of Mathematical Analysis and Applications	1821-1291	X		12	9-Jan
43	Abdullah Shoaib,	Generalized c ontraction involving an open ball and common Fixed point of multivalued mappings in ordered dislocated quasi metric space	Mathematics				8	32-43
44	Atifa Latif, Muhammad Afzal Rana	MHD Three-Dimensional Free Convective Flow with Periodic Permeability and Heat Transfer of a Second-Grade Fluid	Mathematical Problems in Engineering	1024123X	W	1.009	2021	21
45	Muhammad Afzal Rana	Mathematical Analysis of Pseudoplastic Polymers during Reverse Roll-Coating	Polymers	2073-4360	W	3.426	2020, 12	2285
46	Muhammad Afzal Rana	Theoretical Study of the Reverse Roll Coating of Non-Isothermal Magnetohydrodynamics Viscoplastic Fluid	Coatings	2079-6412	W	2.33	10, 940	
47	Muhammad Zafar, Muhammad A. Rana	Mathematical analysis of a non-Newtonian polymer in the forward roll coating process	Journal of Polymer Engineering	0334-6447	W	1.126	2020	10-Jan
48	M A Rana	Mathematical model of eyring fluid in a scraped surface heat exchanger	Journal of the National Science Foundation of Sri Lanka	1391-4588, 2362-0161	W	0.419	48(1)	14-Mar
49	M. A. Rana	Mathematical assessment of the spermatozoa transport through couple stress fluid in an asymmetric human cervical canal	Theory in Biosciences	1431-7613, 1611-7530	W	1.303	Jun-20	
50	Dr. Rehana Rahim	Particle dynamics and geometric optics in Chern–Simons black holes	Annals of Physics	Mar-16	W	2.083	428	168435
51	M. Ijaz Khan, Shahid Farooq	Modeling and simulation of micro-rotation and spin gradient viscosity for ferromagnetic hybrid (Manganese Zinc Ferrite, Nickle Zinc Ferrite) nanofluids	Mathematics and Computers in Simulation	0378-4754	W	1.62	185	497-509
52	M. Ijaz Khan, Shahid Farooq	Modeling and Analysis of Magnetized Nanomaterial Williamson Towards a Variable Thicked Surface Subject to Joule Heating and Activation Energy	Journal of Magnetics	2233-6656	W	0.495	26	10-Jan

Sr. No	Name of Riphah's Author	Publication Title	Journal Name	ISSN	Category	Impact Factor	Vol (Iss No.)	Pg No.
53	M. Ijaz Khan, Shahid Farooq	Aspects of constructive/destructive chemical reaction with activationenergy for Darcy-Forchheimer hybrid nanofluid flow due to semi-infiniteasymmetric channel with absorption and generation features	Ain Shams Engineering Journal	2090-4479	W	1.949		
54	Shahid Farooq , M. Ijaz Khan	Al2O3-47 nm and Al2O3-36 nm characterizations of nonlinear differential equations for biomedical applications: Magnetized peristaltic transport	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236		
55	M. Ijaz Khan, Shahid Farooq	Dynamics and modeling of nonlinear forced convective flow of Carreau-fluid (non-Newtonian fluid) with Marangoni convection	Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science	2041-2983	W	1.386		
56	Dr Muhammad Asad Zaighum	Characterization of Soft S-Open Sets in Bi-Soft Topological Structure Concerning Crisp Points	Symmetry	2073-8994	X	2.645	8	2100
57	Dr Muhammad Asad Zaighum	A note on the boundedness of sublinear operators on grand variable Herz spaces	Journal of Inequalities and Applications	1029-242X	X	1.47	2020	13-Jan
58	Dr Muhammad Asad Zaighum	Zagreb-Type Indices of-Vertex Join and-Edge Join of Graphs	Journal of Chemistry	2090-9071	X	1.79	2020	12-Jan
59	Dr Muhammad Asad Zaighum	Computing Molecular Topological Descriptors of Polymeric Networks Modeled by Sierpinski Networks	Polycyclic Aromatic Compounds	1563-5333	X	1.894	--	20-Jan
60	Dr Muhammad Asad Zaighum	Computing Eccentricity-Based Topological Indices of 2-Power Interconnection Networks	Journal of Chemistry	2090-9071	X	1.79	2020	12-Jan
61	Dr Muhammad Asad Zaighum	Eccentricity based topological indices of siloxane and POPAM dendrimers	Main Group Metal Chemistry	2191-0219	X	0.558	43	92-98
62	Dr Muhammad Asad Zaighum	Computational approach for intransitive action of Δ (2; 4; k) on PL (Fq)	Quasigroups and Related Systems	1561-2848	Y	--	28	139-148
63	M. Ijaz Khan	Flow and thermal management of magneto cross nanofluids over a thin needle with auto catalysis chemical reactions	International Journal of Modern Physics B	0217-9792	X	0.833	34	2050287
64	M. Ijaz Khan	Cattaneo-Christov Double Diffusions (CCDD) in entropy optimised magnetized second grade nanofluid with variable thermal conductivity and mass diffusivity	Journal of Material Research and Technology	2238-7854	W	5.289	9	13977-13987
65	M. Ijaz Khan	Free convection and radiation effects in nanofluid (Silicon dioxide and Molybdenum disulfide) with second order velocity slip, entropy generation, Darcy-Forchheimer porous medium	International Journal of Hydrogen Energy	0360-3199	W	4.939	46	1362-1369
66	M. Ijaz Khan	CVFEM based numerical investigation and mathematical modeling of surface dependent magnetized Copper-Oxide nanofluid flow using new model of porous space	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	37	1481-1494
67	M. Ijaz Khan	Dynamics of coupled reacted flow of Oldroyd-B material induced by isothermal/exothermal stretched disks with viscous dissipation and magnetic dipoles	Alexandria Engineering Journal	1110-0168	W	2.46	60	767-783
68	M. Ijaz Khan	Dynamics of Dust Particles in a Conducting Dusty Nanomaterials: A Computational Approach	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	119	104967
69	M. Ijaz Khan	Numerical and scale analysis of Eyring-Powell nanofluid towards a magnetized stretched Riga surface with entropy generation and internal resistance	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	119	104968
70	M. Ijaz Khan	Convective nonlinear thermally developed flow of thixotropic nanoliquid configured by Riga surface with gyrotactic microorganism and activation energy: A bio-technology and thermal extrusion model	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	119	104966
71	M. Ijaz Khan	Aspects of constructive/destructive chemical reactions for viscous fluid flow between deformable wall channel with absorption and generation features	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	120	104956
72	M. Ijaz Khan	Modeling and Non-similar analysis for Darcy-Forchheimer-Brinkman model of Casson fluid in a porous media	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	119	104955
73	M. Ijaz Khan	Fully developed entropy optimized MHD nanofluid flow by a variable thicked rotating surface	Applied Physics A	1432-0630	X	1.81	126	890
74	M. Ijaz Khan	Bioconvection assessment in Maxwell nanofluid configured by a Riga surface with nonlinear thermal radiation and activation energy	Surfaces and Interfaces	2468-0230	X	3.724	21	100749
75	M. Ijaz Khan	Thermophoresis particle deposition analysis for nonlinear thermally developed flow of Magneto-Walter's B nanofluid with buoyancy forces	Alexandria Engineering Journal	1110-0168	W	2.46	60	1851-1860

Sr. No	Name of Riphah's Author	Publication Title	Journal Name	ISSN	Category	Impact Factor	Vol (Iss No.)	Pg No.
76	M. Ijaz Khan	Entropy Analysis in the Rabinowitsch Fluid Model Through Inclined Wavy Channel: Constant and Variable Properties	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	119	104980
77	M. Ijaz Khan	Mathematical modeling and heat transfer in nanofluid flow of Newtonian material between two rotating disks	Applied Nanoscience	2190-5517	W	2.88	--	--
78	M. Ijaz Khan	Scrutiny of entropy optimized tangent hyperbolic fluid (Non-Newtonian) through perturbation and numerical methods between heated plates	Advances in Mechanical Engineering	1687-8132	W	1.161	12	12-Jan
79	M. Ijaz Khan	Cattaneo-Christov Double Diffusion (CCDD) and magnetized stagnation point flow of non-Newtonian fluid with internal resistance of particles	Physica Scripta	0031-8949	W	1.985	95	125002
80	M. Ijaz Khan	Numerical simulation and modeling of Entropy generation in Marangoni convective flow of nanofluid with activation energy	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
81	M. Ijaz Khan	Dynamics of Arrhenius activation energy in flow of Carreau fluid subject to Cattaneo-Christov (CC) heat flux	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
82	M. Ijaz Khan	Perturbation and Numerical Solutions of non-Newtonian Fluid Bounded within in a Porous Channel: Applications of Pseudo-Spectral Collocation Method	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
83	M. Ijaz Khan	Non-magnetized mixed convective viscous flow submerged in Titanium Oxide and Aluminum Titanium Oxide Hybrid Nanoparticles towards a surface of cylinder	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	120	105027
84	M. Ijaz Khan	Falkner-Skan time-dependent bioconvrction flow of cross nanofluid with nonlinear thermal radiation, activation energy and melting process	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	120	105028
85	M. Ijaz Khan	Transportation of Marangoni Convection and Irregular Heat Source in Entropy Optimized Dissipative Flow	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	120	105031
86	M. Ijaz Khan	Multi-phase flow of Jeffrey Fluid bounded within Magnetized Horizontal Surface	Surfaces and Interfaces	2468-0230	X	3.724	22	100846
87	M. Ijaz Khan	Significance of temperature-dependent viscosity and thermal conductivity of Walter's B nanoliquid when sinusodal wall and motile microorganisms density are significant	Surfaces and Interfaces	2468-0230	X	3.724	22	100849
88	M. Ijaz Khan	Stability analysis and modeling for the three-dimensional Darcy-Forchheimer stagnation point nanofluid flow towards a moving surface	Applied Mathematics and Mechanics	0253-4827	W	2.017	42	357–370
89	M. Ijaz Khan	Numerical simulation of advection–diffusion equation with caputo-fabrizio time fractional derivative in cylindrical domains: Applications of pseudo-spectral collocation method	Alexandria Engineering Journal	1110-0168	W	2.46	60	1731-1738
90	M. Ijaz Khan	Thermophoresis particle deposition analysis for nonlinear thermally developed flow of Magneto-Walter's B nanofluid with buoyancy forces	Alexandria Engineering Journal	1110-0168	W	2.46	60	1851-1860
91	M. Ijaz Khan	Heat and mass transfer analysis for bio-convective flow of Eyring Powell nanofluid over a Riga surface with nonlinear thermal features	Numerical Methods for Partial Differential Equation	1098-2426	W	2.236	--	--
92	M. Ijaz Khan	Radiative heat flux and bio-convective flow of Eyring Powell nano liquid over a Riga surface	Numerical Methods for Partial Differential Equation	1098-2426	W	2.236	--	--
93	M. Ijaz Khan	Assessment of bioconvection in magnetized Sutterby nanofluid configured by a rotating disk: A numerical approach	Modern Physics Letter B	1793-6640	X	0.731	--	--
94	M. Ijaz Khan	Dynamics of Activation Energy and Nonlinear Mixed Convection in Darcy-Forchheimer Radiated Flow of Carreau Nanofluid near Stagnation Point Region	Journal of Thermal Science & Engineering Applications	1948-5093	W	1.544	13	51009
95	M. Ijaz Khan	Nonlinear dissipative slip flow of Jeffrey nanomaterial towards a curved surface with entropy generation and activation energy	Mathematics and Computers in Simulation	0378-4754	W	1.62	185	47-61
96	M. Ijaz Khan	Regular perturbation solution of Couette flow (non-Newtonian) between two parallel porous plates: a numerical analysis with irreversibility	Applied Mathematics and Mechanics	0253-4827	W	2.017	42	127–142
97	M. Ijaz Khan	Numerical and Scale Analysis of non-Newtonian fluid (Eyring-Powell) through Pseudo-Spectral Collocation Method (PSCM) towards a Magnetized Stretchable Riga Surface	Alexandria Engineering Journal	1110-0168	W	2.46	60	2127-2137

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98	M. Ijaz Khan	Dynamics and modeling of nonlinear forced convective flow of Carreau-fluid (non-Newtonian fluid) with Marangoni convection	Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science	2041-2983	W	1.386	--	--
99	M. Ijaz Khan	Comparative Study of Ferromagnetic Hybrid (Manganese Zinc Ferrite, Nickle Zinc Ferrite) Nanofluids With Velocity Slip and Convective Conditions	Journal of Magnetics	1226-1750	X	0.48	--	--
100	M. Ijaz Khan, Shahid Farooq	Al☐O☐-47nm and Al☐O☐-36nm characterizations of nonlinear differential equations for biomedical applications: Magnetized peristaltic transport	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
101	M. Ijaz Khan	Perturbation Based Analytical Solutions of Non-Newtonian Differential Equation with Heat and Mass Transportation between Horizontal Permeable Channel	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
102	M. Ijaz Khan	Photocatalytic Pretreatment of Commercial Lignin Using TiO2-ZnO Nanocomposite Derived Advance Oxidation Process for Methane Production Synergy in Lab Scale Continuous Reactors	Catalysts	2073-4344	W	3.52	11	54
103	M. Ijaz Khan	Peristaltic activity for Electro-kinetic complex driven cilia transportation through a non-uniform channel	Computer Methods and Programs in Biomedicine	0169-2607	W	3.632	200	105926
104	M. Ijaz Khan	Mathematical Modeling of Bio-Magnetic Fluid Bounded within Ciliated Walls of Wavy Channel	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
105	M. Ijaz Khan	Two-Phase Flow of MHD Jeffrey fluid Suspended with Hafnium and Crystal Particles: Analytical Treatment	Numerical Methods for Partial Differential Equations	1098-2426	W	2.236	--	--
106	M. Ijaz Khan							
107	M. Ijaz Khan	Optimized frame work for Reiner-Philippoff nanofluid with improved thermal sources and Cattaneo-Christov modifications: A numerical thermal analysis	International Journal of Modern Physics B	0217-9792	X	0.833	--	--
108	M. Ijaz Khan, Shahid Farooq	Modeling and Simulation of Micro-Rotation and Spin Gradient Viscosity for Ferromagnetic Hybrid (Manganese Zinc Ferrite, Nickle Zinc Ferrite) Nanofluids	Mathematics and Computers in Simulation	0378-4754	W	1.62	185	497-509
109	M. Ijaz Khan	Analysis of Buongiorno's nanofluid model in Marangoni convective flow with gyrotactic microorganism and activation energy	International Journal of Modern Physics C	0129-1831	X	1.228	--	--
110	M. Ijaz Khan, Shahid Farooq	44. A higher order slip flow of generalized Micropolar nanofluid with applications of motile microorganisms, nonlinear thermal radiation and activation energy	International Journal of Modern Physics B	0217-9792	X	0.833	--	--
111	M. Ijaz Khan	Mathematical Modeling of Multiphase Flows of Third Grade Fluid with Lubrication effects through an Inclined Channel: Analytical Treatment	Journal of Dispersion Science and Technology	1532-2351	X	1.701	--	--
112	M. Ijaz Khan	Slip flow of micropolar nanofluid over a porous rotating disk with motile microorganisms, nonlinear thermal radiation and activation energy	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	122	105161
113	M. Ijaz Khan	Numerical simulation of squeezing flow Jeffrey nanofluid confined by two parallel disks with the help of chemical reaction: Effects of activation energy and microorganisms	International Journal of Chemical Reactor Engineering	1542-6580	X	1.152	--	--
114	M. Ijaz Khan	Immunoinformatics based prediction of recombinant multi-epitope vaccine for the control and prevention of COVID-19	Alexandria Engineering Journal	1110-0168	W	2.46	60	3087-3097
115	M. Ijaz Khan	Joule heating, activation energy and modified diffusion analysis for 3-D slip flow of tangent hyperbolic nanofluid with gyrotactic microorganisms	Modern Physics Letters B	0217-9849	X	0.731	--	--
116	M. Ijaz Khan	Transportation of hybrid nanoparticles in forced convective Darcy-Forchheimer flow by a rotating disk	International Communications in Heat and Mass Transfer	0735-1933	W	3.971	122	105177
117	M. Ijaz Khan	Critical values in axisymmetric flow of magneto-Cross nanomaterial towards a radially shrinking disk	Modern Physics Letters B	0217-9849	X	0.731	--	--
118	M. Ijaz Khan	Artificial Neural Networking (ANN) analysis for heat and entropy generation in flow of non-Newtonian fluid between two rotating disks	Mathematical Methods in the Applied Sciences	1099-1476	W	1.626	--	--

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119	M. Ijaz Khan	Heat transport and bio-convective nanomaterial flow of Walter's-B fluid containing gyrotactic microorganisms	Ain Shams Engineering Journal	2090-4479	X	1.949	--	--
120	M. Ijaz Khan	Double Diffusive Convection and Hall Effect in Creeping Flow of Viscous Nanofluid through a Convergent Microchannel: A biotechnological applications	Computer Methods in Biomechanics and Biomedical Engineering	1476-8259	W	1.194	--	--
121	M. Ijaz Khan	Interfacial layer and shape effects of modified Hamilton's Crosser model in entropy optimized Darcy-Forchheimer flow	Alexandria Engineering Journal	1110-0168	W	2.46	60	4067-4083
122	M. Ijaz Khan	Thermal and boundary layer flow analysis for MWCNT-SiO2 hybrid nanoparticles: An experimental thermal model	Modern Physics Letter B	0217-9849	X	0.731	--	--
123	M. Ijaz Khan	Geopolymer Concrete Compressive Strength Via Artificial Neural Network, Adaptive Fuzzy Interface system and Gene Expression Programming with K-Fold Cross-Validation	Frontiers in Materials	2296-8016	X	2.705	--	--
124	M. Ijaz Khan	Modeling and numerical computation of non-similar forced convective flow of viscous material towards an exponential surface	International Journal of Modern Physics B	0217-9792	X	0.833	--	--
125	M. Ijaz Khan	Soret and Dufour effects in entropy optimized mixed convective flow of Carreau-Yasuda fluid: A numerical study	Revista de Educacion	1988-592X	W	0.761	--	--
126	M. Ijaz Khan							
127	M. Ijaz Khan	Dynamics of multiple solutions of Darcy-Forchheimer saturated flow of Cross nanofluid by a vertical thin needle point	European Physical Journal Plus	2190-5444	W	3.228	136	315
128	M. Ijaz Khan	Two-Phase flow of MHD Jeffrey fluid with the suspension of tiny metallic particles incorporated with viscous dissipation	Advances in Mechanical Engineering	1687-8132	W	1.161	--	--
129	M. Ijaz Khan	Comparative analysis of Al_2O_3-47nm and Al_2O_3-36nm hybrid nanoparticles in a symmetric porous peristaltic channel	Physica Scripta	0031-8949	W	1.985	--	--
130	M. Ijaz Khan	Slip flow of Jeffrey nanofluid with activation energy and entropy generation applications	Advances in Mechanical Engineering	1687-8132	W	1.161	--	--
131	M. Ijaz Khan	Magnetized surface of motile microorganisms investigation in three-dimensional radiative Sisko-nanofluid flow	Coatings	2079-6412	W	2.436	11	335
132	M. Ijaz Khan	Two-Phase Flow of MHD Jeffrey Fluid with the Suspension of Tiny Metallic Particles Incorporated with Viscous Dissipation	Advances in Mechanical Engineering	1687-8132	W	1.161	--	--
133	M. Ijaz Khan	Dynamics of Dust Particles in a Conducting Water based Kerosene Nanomaterials: A Computational Approach	International Journal of Chemical Reactor Engineering	1542-6580	X	1.152	--	--
134	M. Ijaz Khan	Clinical Utility of Serum Periostin Level to Diagnose the Severity of Sars-Cov-2: A Novel Apprroach for Development of Cov-2 Serummarkes	Revista de Educacion	1988-592X	W	0.761	--	--
135	M. Ijaz Khan	Analysis of single and multi-wall carbon nanotubes (SWCNT/MWCNT) in the flow of Maxwell nanofluid with the impact of magnetic dipole	Computational and Theoretical Chemistry	2210-271X	Y	1.605	1200	113223
136	M. Ijaz Khan	Entropy optimized Darcy-Forchheimer flow of Reiner-Philippoff fluid with chemical reaction	Computational and Theoretical Chemistry	2210-271X	Y	1.605	1200	113222
137	M. Ijaz Khan	Marangoni convective flow of hybrid nanofluid (MnZiFe2O4-NiZnFe2O4-H2O) with Darcy Forchheimer medium	Ain Shams Engineering Journal	2090-4479	X	1.949	--	--
138	M. Ijaz Khan	Study of Buongiorno's nanofluid model for flow due to stretching disks in presence of gyrotactic microorganisms	Ain Shams Engineering Journal	2090-4479	X	1.949	--	--
139	M. Ijaz Khan	Peristaltic activity in an asymmetric inclined channel with inertial forces under the inducement of magnetic field: Finite Element Method	Alexandria Engineering Journal	1110-0168	W	2.46	60	4723-4734
140	M. Ijaz Khan	Novel Scientific Simulations (Finite Element Method) for Peristaltic Blood Flow in an Asymmetric Channel: Applications of Magnetic and Inertial Forces	Journal of Magnetics	1226-1750	X	0.48	26	129-140
141	M. Ijaz Khan	Dynamics of unsteady reactive flow of viscous nanomaterial subject to Ohmic heating, heat source and viscous dissipation	Ain Shams Engineering Journal	2090-4479	X	1.949	--	--

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142	M. Ijaz Khan	Bioconvection analysis for Sutterby nanofluid over an axially stretched cylinder with melting heat transfer: A Marangoni and solutal model	Alexandria Engineering Journal	1110-0168	W	2.46	60	4663-4675
143	M. Ijaz Khan	Aspects of constructive/destructive chemical reaction for Darcy-Forchheimer hybrid nanofluid flow due to semi-infinite asymmetric channel with absorption and generation features	Ain Shams Engineering Journal	2090-4479	X	1.949	--	--
144	M. Ijaz Khan	Applications of modified Darcy law and nonlinear radiation in bioconvection flow of micropolar nanofluid over an off centered rotating disk	Alexandria Engineering Journal	1110-0168	W	2.46	60	4607-4618
145	M. Ijaz Khan	Comparative Study of Ferromagnetic Hybrid (Manganese Zinc Ferrite, Nickle Zinc Ferrite) Nanofluids With Velocity Slip and Convective Conditions	Physica Scripta	0031-8949	W	1.985	--	--
146	M. Ijaz Khan	Influence of Thermo-Diffusion and Dissipation Thermo on the Characteristics of Optimized Mixed Convective Radiative Laminar Flow with Chemical Reaction	Computational and Theoretical Chemistry	2210-271X	Y	1.605	--	--
147	M. Ijaz Khan and Shahid Farooq	Modeling and analysis of magnetized nanomaterial Williamson towards a variable thicked surface subject to Joule heating and activation energy	Journal of Magnetics	1226-1750	X	0.48	--	--
148	M. Ijaz Khan	Numerical simulation of AA7072-AA7075/water-based hybrid nanofluid flow over a curved stretching sheet with Newtonian heating: A non-Fourier heat flux model approach	Journal of Molecular Liquids	1873-3166	W	5.065	--	--
149	M. Ijaz Khan	Mathematical Modeling and MHD Flow of Micropolar Fluid towards an Exponential Curved Surface: Heat Analysis via Ohmic Heating and Heat Source/Sink	Arabian Journal for Science and Engineering	2191-4281	W	1.711	--	--
150	M. Ijaz Khan	MHD flow study of viscous fluid through a complex wavy curved surface due to bio-mimetic propulsion under porosity and second-order slip effects	Communications in Theoretical Physics	0253-6102	X	1.332	--	--
151	M. Ijaz Khan	Nonlinear heat source/sink and activation energy assessment in double diffusion flow of micropolar (non-Newtonian) nanofluid with convective conditions	Arabian Journal for Science and Engineering	2191-4281	W	1.711	--	--
152	Nawab Khan, M Yaqub Khan	TRAVELLING WAVE SOLUTION OF THE PARTIAL DIFFERENTIAL EQUATIONS DESCRIBING NONLINEAR WAVE MOTION	Journal of Science and Arts	1844-9581	X			1035-1044
153	M Jamil, M Yaqub Khan	The induced generalized interval-valued intuitionistic fuzzy einstein hybrid geometric aggregation operator and their application to group decision-making	Journal of Science and Arts					
154	Sanam Ayub, M Yaqub Khan	Cubic fuzzy Heronian mean Dombi aggregation operators and their application onmulti-attribute decision-making problem	Journal of Intelligent & Fuzzy Systems					
155	Nawab Khan, M Yaqub Khan	ANALYTICAL TECHNIQUE WITH LAGRANGE MULTIPLIER FOR SOLVING SPECIFIC NONLINEAR DIFFERENTIAL EQUATIONS	Soft Computing					
156	Prof. Dr Muhammad Aslam	A modified-mxEWMA location chart for the improved process monitoring using auxiliary information and its application in wood industry.	Quality Technology & Quantitative Management		W	2.231	17	561-579
157	Prof. Dr Muhammad Aslam	On mixed memory control charts based on auxiliary information for efficient process monitoring.	Quality and Reliability Engineering International		W	1.718	36	1949-1968
158	Prof. Dr Muhammad Aslam	Bayesian analysis of the Weibull paired comparison model using informative prior,	Alexandria Engineering Journal		W	2.46	59	2371-2378
159	Prof. Dr Muhammad Aslam	Mixture of Transmuted Pareto Distribution: Properties, Applications and Estimation under Bayesian Framework,	Journal of the Franklin Institute-Engineering & Applied Mathematics		W	4.036	375	2934- 2957
160	Prof. Dr Muhammad Aslam	Bayesian analysis for 3-Component mixture of exponentiated Weibull distribution assuming non-Informative priors	Journal of Statistical Computation and Simulation		W	0.918	90	586-605
161	Prof. Dr Muhammad Aslam	Reliability estimation from Topp Leone mixture distribution using optimal progressive censoring schemes: A Bayesian approach	Alexandria Engineering Journal		W	2.46	59	1539-1556
162	Prof. Dr Muhammad Aslam	An improved Bayesian Modified-EWMA location chart and its applications in mechanical and sport industry	Plos-one		W	2.74	15	229422
163	Prof. Dr Muhammad Aslam	A 3-component mixture of exponential distribution assuming doubly censored data: properties and Bayesian estimation,	Journal of Statistical Theory & Application		X		19	197-211

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1	Azmat Iqbal	Proposal of graphene band-gap enhancement via heterostructure of graphene with boron nitride in vertical stacking scheme	Nanotechnology	0957-4484	W	3.551	32	225705
2	Sikander Azam, Azmat Iqbal	A systematic study on optoelectronic properties of Mn4+-activated Zr-based hexafluoride red phosphors X2ZrF6 (X=K, Na, Cs): first-principles investigation and prospects for warm-white LEDs applications	Physica Scripta	0031-8949	W	1.985	96	15801
3	Sikander Azam, Azmat Iqbal	Proposal of new stable ABC2 type ternary semiconductor pnictides K3Cu3P2 and K3Ni3P2: First-principles calculations and prospects for thermophysical and optoelectronic applications	International Journal of Energy Research	1099-114X	W	3.741	45	2980-2996
4	Azmat Iqbal, Amin Ur Rahman, Sikander Azam	Mechanical and thermodynamic stability, structural, electronics and magnetic properties of new ternary thorium-phosphide silicides ThSixP1-x: First-principles investigation and prospects for clean nuclear energy applications	Nuclear Engineering and Technology	1738-5733	W	1.846	53	592-602
5	Amin Ur Rahman, Azmat Iqbal, Sikander Azam	First-principles predictions of DFT, DFT + U and DFT + U + SOC methods, Materials research Express			W	1.929	6	126129
6	Dr. Muhammad Tahir khan	Influence of Annealing on the Damping Behavior of Ni-Cu-Mn-Ga Ferromagnetic Shape Memory Alloys.	Materials	1996-1944	w	3.01	13	0001-0009
7	Dr. Muhammad Tahir khan	2- Synthesis of two new Cd(II)-MOFs based on different secondary building units with highly selective gas sorption for CO2/CH4 and luminescent sensor for Fe3+ and Cr2O72− ions	journal of Solid State Chemistry	0254-0584	W	2.3	596	30088-8
8	Dr. Muhammad Tahir khan	3- Large exchange bias in magnetic shape memory alloys by tuning magnetic ground state and magnetic-field history	SCIENCE CHINA Materials	2095-8226	W	5.3	63	1291–1299
9	Dr. Muhammad Tahir khan	4- Synthesis and cyclic voltammetry of CrFe2O4/(MWCNTs)x nanohybrids.	Materials Science: Materials in Electronics	0957-4522	W	2.3	13	13909–13918
10	Dr. Muhammad Tahir khan	5- Study of structural, magnetic and radio frequency heating aptitudes of pure and (Fe-III) doped manganite (La1- x SrxMnO3) and their incorporation with Sodium PolyStyrene Sulfonate (PSS) for magnetic hyperthermia applications	Physica B: Physics of Condensed Matter.	0008-6223	W	2	600	412627
11	Dr. Muhammad Tahir khan	6- Magnetocaloric effect and critical exponent analysis around magnetic phase transition in NdCo2 compound	Journal of Physics D: Applied Physics	1361-6463	W	2.9	53	345003
12	Dr. Muhammad Tahir khan	7- Multi-walled carbon nanotubes and chromium ferrites nanoparticles nanohybrids as anode materials for lithium-ion batteries.	Journal of Alloys and Compounds	0925-8388	W	4.6	872	159164
13	Dr. Irfan Qasim	AC Conduction Mechanism in (Cu) x /(CuTl)-1223 Nanoparticles–Superconductor Composites	Journal of Low Temperature Physics	1573-7357	X	1.09	199	1268-1298
14	Dr. Irfan Qasim	Search for half-metallicity in new ferrimagnetic quaternary MnXMoAl (X= Co and Ti) Heusler alloys: A DFT based investigation	Journal of Materials Chemistry & Physics	0254-0584	W	3.408	245	122779
15	Dr. Irfan Qasim	Determination of Lead and Chromium in Aloe Vera Pulp and Aloe Vera-Based Cosmetics by Laser-Induced Breakdown Spectroscopy (LIBS)	Analytical Letters	1532-236X	X	1.467	53	2571-2584
16	Dr. Irfan Qasim	AC-Conduction Mechanism via Dielectric Measurements of (Cr)y/CuTl-1223 Nanoparticles-Superconductor Composites	Cryogenics	0011-2275	W	1.818	105	103021
17	Dr. Irfan Qasim	Large Magnetotransport Properties in Mixed-Dimensional Heterostructures of 2D Dirac Van der Waals Materials	CARBON	0008-6223	W	8.821	159	648-655
18	Muhammad Farooq Nasir, Muhammad Tahir Khan	Study of structural, magnetic and radio frequency heating aptitudes of pure and (Fe-III) doped manganite (La1-xSrxMnO3) and their incorporation with Sodium Poly-Styrene Sulfonate (PSS) for magnetic hyperthermia applications	Physica B	0921-4526	X	1.902	600	412627
19	Mahpara Ghazanfar, Sikander Azam, Muhammad Farooq Nasir	Insight into electronic and optical properties of Eu+2-doped CaTiO3 from GGA+U calculations	Journal of Solid State Chemistry	0022-4596	W	2.726	293	121796

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20	Mahpara Ghazanfar, Sikander Azam, Muhammad Farooq Nasir	Exploring the potential use of Ca[LiAl3N4]:Eu2+ as phosphor-LED material: Ab-initio calculations	Materials Today Communications	2352-4928	X	2.678	25	101302
21	Muhammad Farooq Nasir	Physical properties of sublimated ternary compound CdZnS thin films	Journal of Ovonic Research	1584 - 9953	Y	0.785	16	139-146
22	Muhammad Farooq Nasir	Thermal properties of PSS coated cobalt zinc ferrite nanoparticles synthesized by co-precipitation method	Digest Journal of Nanomaterials and Biostructures	1842-3582	X	0.785	15	1207-1214
23	Nasir Mehboob, Muhammad Farooq Nasir, Zafar Iqbal	Structural investigation and improvement of microwave dielectric properties in Ca1-xBaxTiO3, low loss ceramics	Journal of Ceramic Processing Research	1229-9162	Y	0.467	21	745-750
24	Ms Mahpara Ghazanfar	Insight into electronic and optical properties of Eu2+ -doped CaTiO3 from GGA+U calculations.	Journal of Solid State Chemistry	1095-726X, 0022-4596	W	3	25	2352-4928
25	Ms Mahpara Ghazanfar	Exploring the potential use of Ca[LiAl3N4]:Eu2+ as phosphor-LED material: Ab-initio calculations	Materials Today Communications	2352-4928,	X	3	293	0022-4596
26	Nasir Mehboob	Amino Anthraquinone: Synthesis, Characterization, and Its Application as an Active Material in Environmental Sensors	Materials	1996-1944	W	3.057	13	960
27	Nasir Mehboob	Investigating the effect of adding CdO nano particles on neutron shielding efficacy of HDPE	Radiation Physics and Chemistry	0969-806X	W	3.226	177	109145
28	Nasir Mehboob	Synthesis and Microwave Dielectric Characterization of Ca1-xSrxTiO3,Low-Loss Ceramics	Iranian Journal of Science & Technology, Transaction A: Science	1028-6276	X	0.875	45	367
29	Nasir Mehboob	Structural investigation and improvement of microwave dielectric properties in Ca1-xBaxTiO3, low loss ceramics	Journal of Ceramic Processing Research	1229-9162	Y	0.467	21	745
30	Nasir Mehboob	Structural investigation and improvement of microwave dielectricproperties in Ca(HfxTi1-x)O3 ceramics	Physica Scripta	0031-8949	W	1.985	96	25701
31	Ijaz Ahmed	Constraints √ on H ± Parameter Space in 2HDM at 8 TeV and s = 13 TeV	International Journal of Theoretical Physics	1572-9575, 0020-7748	X	1.347	59	3189–3205
32	Ijaz Ahmed	Possibility of Observing Charged Higgs in the Single Top Production Channel at LHC	International Journal of Fuzzy Systems	1562-2479	W	4.406	59	30-06-2020
33	Sikander Azam	An ab-initio investigation of the electronic structure, chemical bonding and optical properties of Ba2HgS5 semiconductor	Molecular Physics		W	1.7	118	e1587026
34	Sikander Azam	Electronic, optical and thermoelectric properties of new metal-rich homological selenides with palladium–indium: Density functional theory and Boltzmann transport model	Journal of Physics and Chemistry of Solids		W	3.442	138	109229
35	Sikander Azam	DFT modeling of thermoelectric and optical features of novel MgxSn1-xSe (x= 6%, 12% & 18%)	Journal of Molecular Graphics & Modelling		W	2.079	94	107484
36	Sikander Azam	Cation effect on electronic, optical and thermoelectric properties of perovskite oxynitrides: Density functional theory	Materials Science in Semiconductor Processing		W	3.085	107	104800
37	Sikander Azam	Ab-initio study of Cu-based oxychalcogenides: A new class of materials for optoelectronic applications	Journal of Solid State Chemistry		W	2.726	284	121191
38	Sikander Azam	Effect of Fe doping on optoelectronic properties of CdS nanostructure: Insights from DFT calculations	Physica B: Condensed Matter		W	1.902	583	412056
39	Sikander Azam, Rahman, Amin Ur;	A Comprehensive Study on Electronic Structure and Optical Properties of the A3 (SF) 2 (a= Hg, Pb)	EasyChair		W			

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