



RIPHAH
INTERNATIONAL UNIVERSITY



Prospectus

**FACULTY OF
ENGINEERING &
APPLIED SCIENCES**

Riphah Values



الْآخِرَةَ

AL-AKHIRAH
(Aakhirah Oriented Decisions)



إِتْقَانٌ

ITQAN
(Pursuit of Excellence)



مُشَاوَرَةٌ

MUSHAWARAH
(Consultation & Harmony)



إِجْتِمَاعِيَّةٌ

IJTIMAIYYAH
(Team Work)



رَحْمَةٌ

RAHMAH
(Compassion)



مُحَاسَبَةٌ

MUHASABAH
(Accountability)

FACULTY OF ENGINEERING & APPLIED SCIENCES

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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”.

Dean's Message



It's my pleasure to welcome and introduce you to the Faculty of Engineering and Applied Sciences (FEAS), Riphah International University, Islamabad. I am humbled and honored to serve as the Dean of this esteemed faculty which is one of the oldest and established faculties of the University. Presently, it consists of fourteen departments in different cities, about 3800 students and 155 faculty members including 80 PhD degree holders. All undergraduate and graduate programs are taught under the semester system.

FEAS is dedicated to fostering academic-excellence, research, and the pursuit of knowledge in the field of engineering and applied sciences. The faculty has been pouring in more than 50% of the total research contribution of the University for the last five years. We strive to provide a vibrant learning environment that nurtures creativity, critical thinking, and technical expertise. In line with Riphah's mission, we equip our students not only with the skills and knowledge they need to thrive in their careers but also inculcate professional ethics and values to make a positive impact on society. We believe in the strength of interdisciplinary collaboration and encourage our students and faculty to explore diverse areas of research and applications specially emerging trends like Artificial Intelligence, Machine learning, mathematical modeling, high-speed computing, and biomedical applications. By adopting the cognitive, psychomotor, and affective domains, we train our graduates to address real-world challenges and complex problems to contribute to groundbreaking advancements in their respective disciplines.

Our faculty comprises professional academicians and researchers who are experts in their area of specializations. They are committed to delivering quality-education, engaging in cutting-edge research, and providing mentorship to students. We take pride in our state-of-the-art facilities and laboratories, which provide ample opportunities for hands-on learning, experimentation, and problem-based learning.

B.Sc. Electrical and Biomedical Engineering programs 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 conferred degree is reckoned as substantially equivalent to the degrees awarded in the signatories of the Washington Accord members including USA, UK, Australia, Canada, Singapore, Malaysia, Turkey, Russia, and China etc.

As a student in our faculty, you will be part of a vibrant community that values inclusivity, diversity, and collaboration. We encourage you to take advantage of the numerous extracurricular activities, students' clubs, and societies that will enrich your experience and help you develop valuable skills beyond the classroom.

I invite you to explore our website or visit to learn more about the programs we offer, our research initiatives, the accomplishments of our faculty and students, and the various resources available to support your academic journey. Please feel free to contact me or my team for any question or information you want for choosing your future alma mater.

I extend a warm welcome once again and assure you of quality education, cutting-edge research, and conducive environment to embark on a transformative educational journey that will shape your future and contribute to the advancement of our society.

Thank you for your interest in FEAS, Riphah International University

(Prof. Dr. Jameel Ahmed)

Dean, Faculty of Engineering and Applied Sciences
jameel.ahmed@riphah.edu.pk

FEAS Leadership

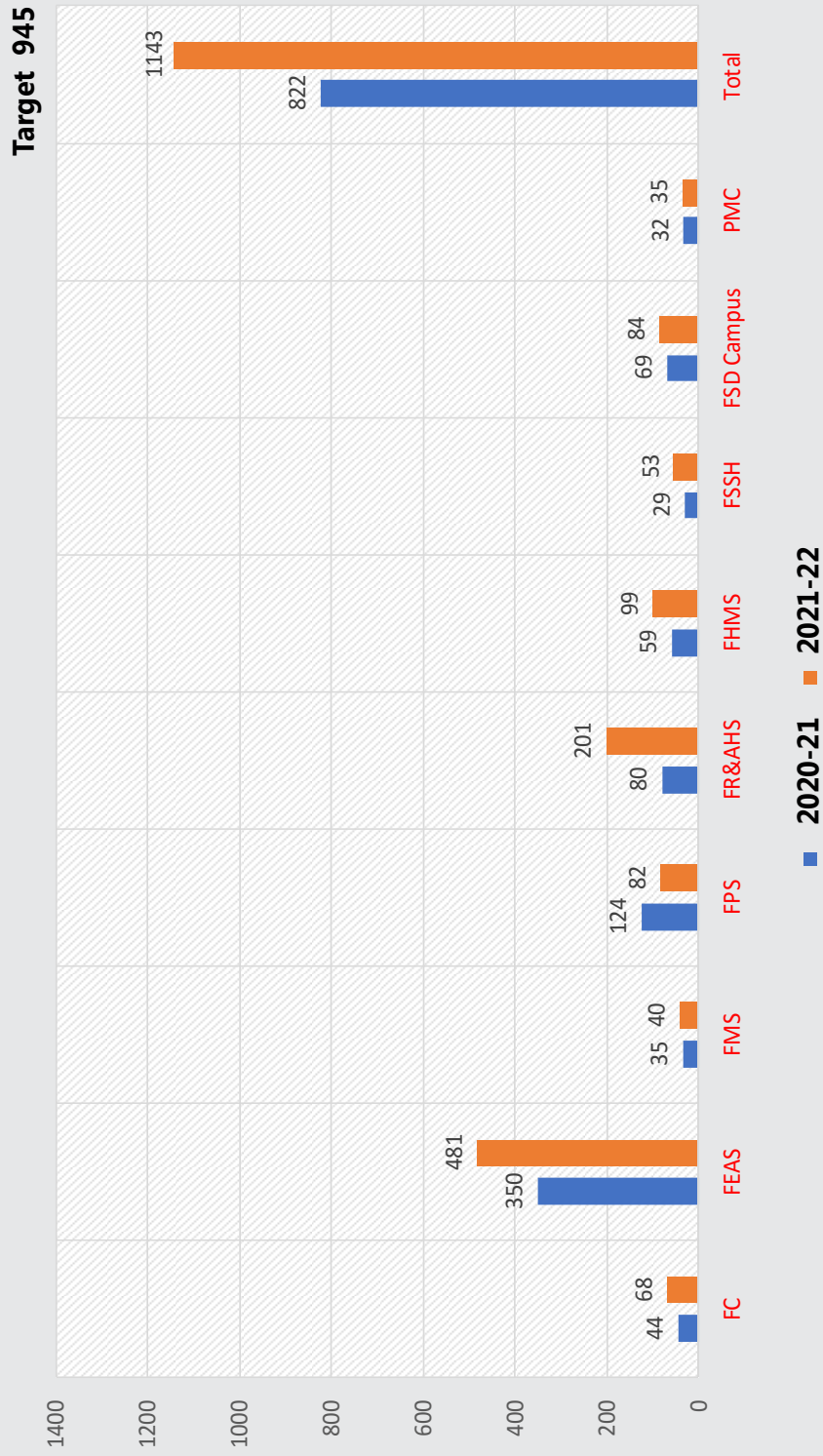


L To R: Dr. Asad Zaighum (HoD, Maths & Statistics Dept.), Dr. Sohail Khalid (HoD, EE Dept.),
Prof. Dr. Jameel Ahmed (DEAN, FEAS), Dr. Faraz Akram (HoD, BME Dept.),
Dr. Farooq Nasir (HoD, Physics Dept.)

Comparison of FEAS Research Publications with Other Faculties

Research Publications of all Faculties Categories W, X & Y (as per HEC-HJRS)

2020-21 & 2021-22



Faculty Mission

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

Program Educational Objectives (PEOs)

BSc Electrical Engineering Program

BSc Biomedical Engineering Program

PEO-1	Graduates will be proficient electrical engineers/biomedical engineers with the ability to solve complex engineering problems and to serve in industries or engage in entrepreneurial activities.
PEO-2	Graduates will contribute individually in a team or be a potential leader in their organizations.
PEO-3	Graduates will exhibit Islamic ethical values and demonstrate commitment to their responsibility toward sustainability and the safety of society and the environment.

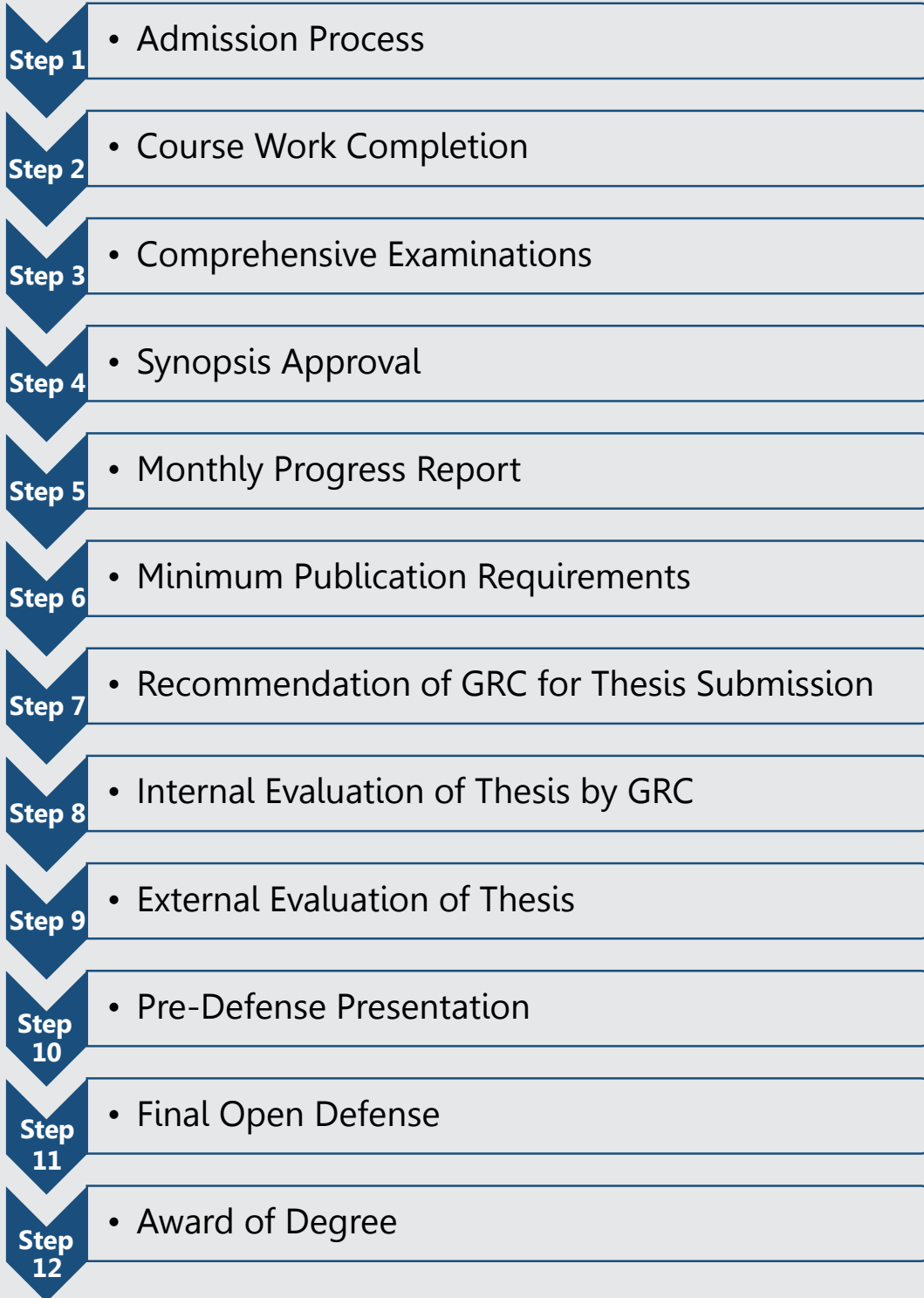
Program Learning Outcomes (PLOs)

BSc Electrical Engineering Program

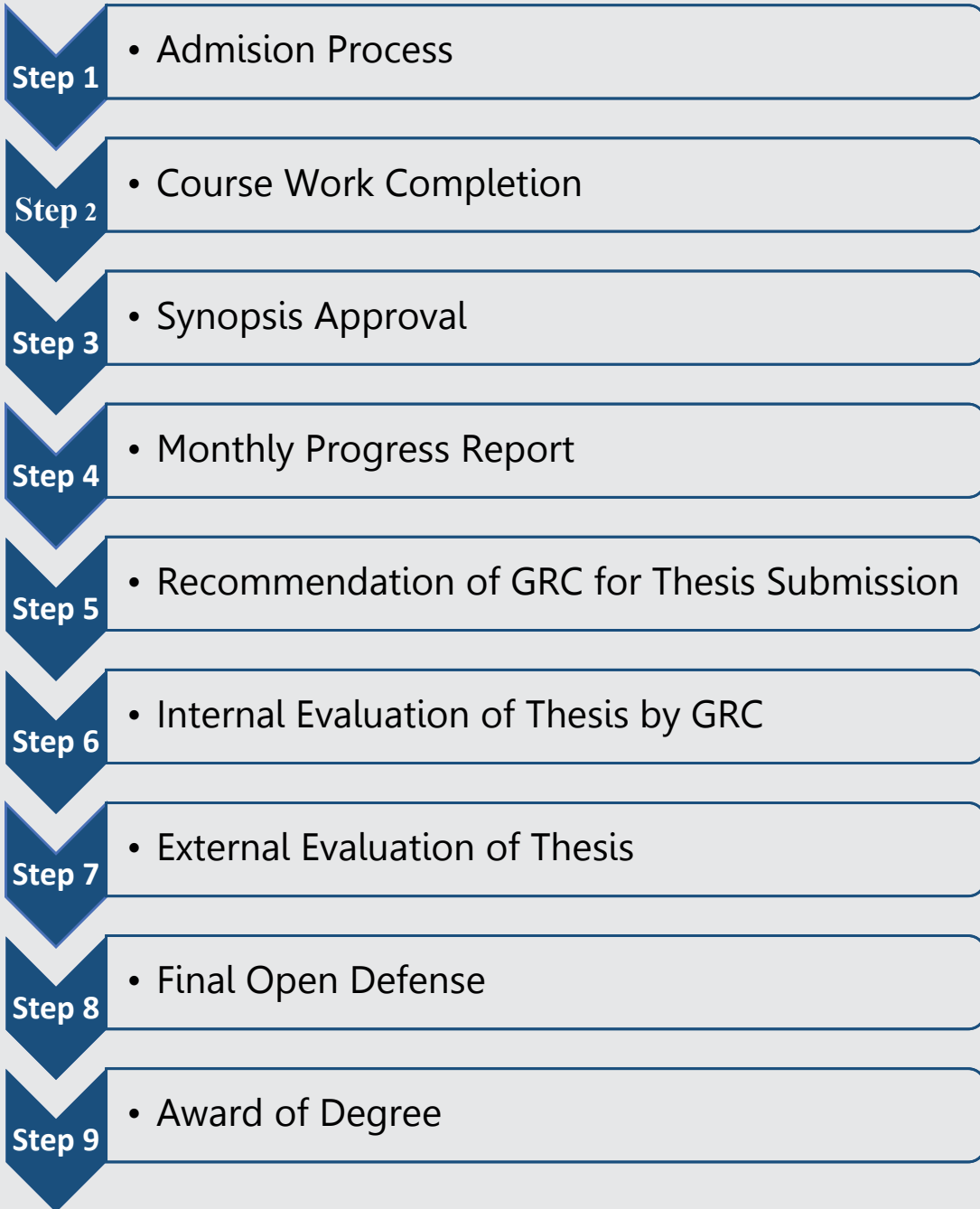
BSc Biomedical Engineering Program

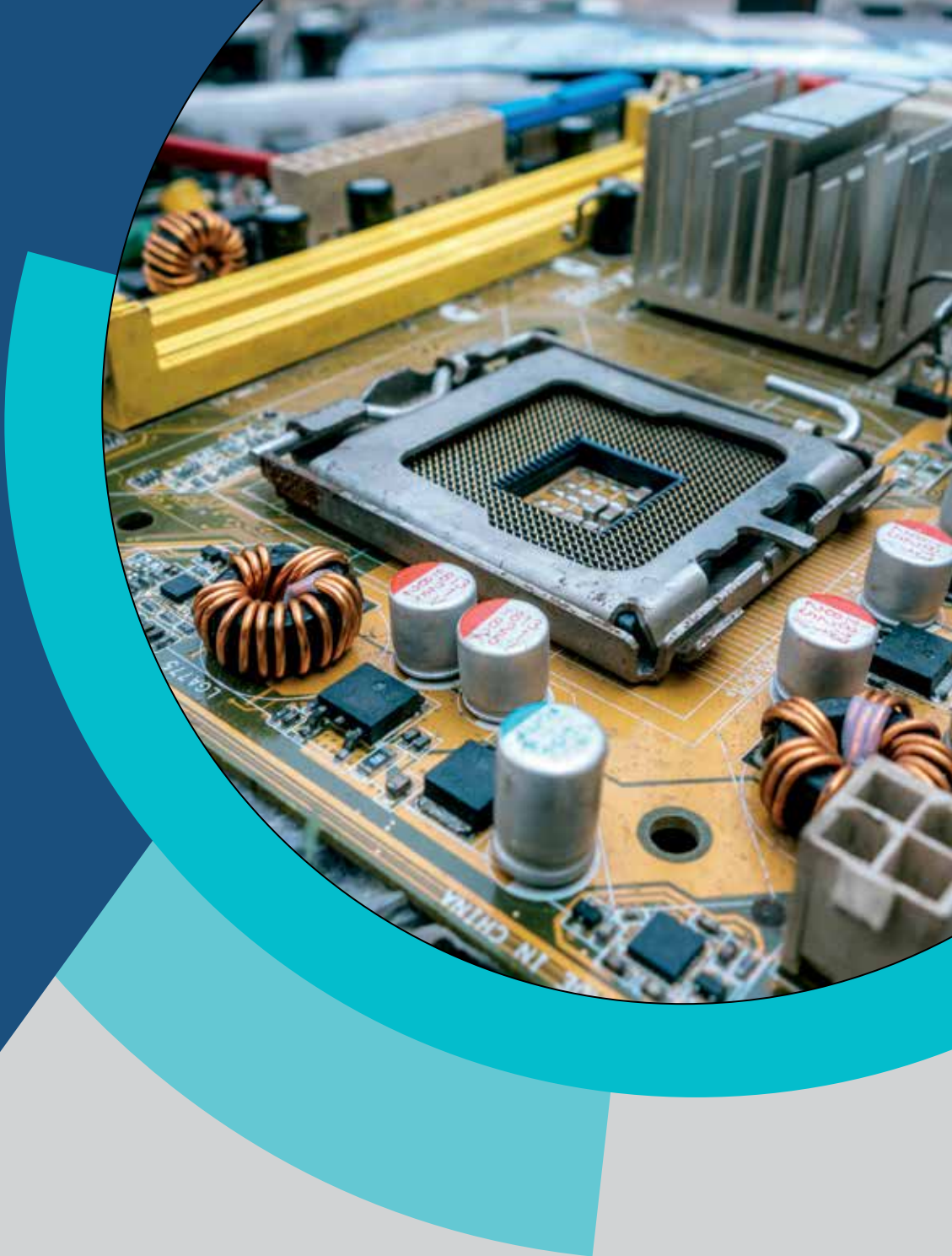
PLO-1	Engineering Knowledge	An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PLO-2	Problem Analysis	An ability to identify, formulate, research literature, and analyze complex engineering 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.

STANDARD OPERATING PROCEDURE (SOP) FOR PhD PROGRAMS



STANDARD OPERATING PROCEDURE (SOP) FOR MS/M.Phil PROGRAMS





Department of
Electrical Engineering

HoD's Message



I extend a warm welcome to all prospective students interested in pursuing studies at the Electrical Engineering Department, Riphah International University, Islamabad. I believe technical education is a vital link between academic learning and professional careers. At RIPHAH, we not only provide cutting-edge technical education but also emphasize personality development to equip our students for the competitive years ahead. Our students undergo a rigorous academic system aligned with the standards set by the Washington Accord, while we also offer opportunities for diverse co-curricular activities, which contribute to the holistic development of their personalities.

In terms of the Department, our focus rests on maintaining high academic standards and promoting the practical application of knowledge. The Electrical Engineering Department boasts a faculty comprising experienced and dynamic individuals who are dedicated to delivering quality education. They employ a teaching methodology that nurtures a strong theoretical foundation, complemented by hands-on practical experience.

Graduates from our program have secured positions in both national and multinational companies. Some have even become successful entrepreneurs, while others have pursued further education at prestigious institutions, both in Pakistan and abroad. The students who have completed our electrical engineering program demonstrate an outstanding job placement rate of 80 percent. Our commitment lies in adhering to the principles of quality teaching, productive research, and the integration of Islamic ethical values. We aim to contribute to the transformation of Pakistan's economy into a knowledge-based economy by producing skilled engineers and entrepreneurs.

Our ultimate objective is to prepare our students to overcome the challenges they will encounter upon completing their degrees. Once again, I warmly welcome all ambitious and energetic students eager to embark on a journey of quality, outcome-based education in Pakistan.

(Dr. Sohail Khalid)

Associate Professor & HOD, Department of Electrical Engineering

FACULTY DEPARTMENT OF ELECTRICAL ENGINEERING

Prof. Dr. Jameel Ahmed

Designation: Professor & Dean
Qualification: Post Doctorate, Nanyang Technological University (NTU), Singapore
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Engr. Muhammad Sadiq Orakzai

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Engr. Muhammad Farrukh Qureshi

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Engr. Adil Zohaib

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Engr. Mubashir Qureshi

Designation: Lab Engineer
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Engr. Tayyaba Nosheen

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Mr. Muhammad Abdul Rehman

Designation: Demonstrator
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Faculty, Department of Electrical Engineering



L to R Sitting: Dr. Shaheryar Najam, Dr. Sohail Khalid (HoD, EE), Prof. Dr. Jameel Ahmed (DEAN, FEAS), Dr. Zohaib Ahmed Khan, Dr. Muhammad Faisal

L to R Standing: Engr. Shehzad Ahmed, Engr. Mubashir Quraishi, Mr. Anjam Iqbal, Engr. Adil Zohaib, Engr. Farrukh Quraishi, Mr. Abdul Rehman, Engr. Yasir Basheer, Engr. Muhammad Sadiq Orakzai, Engr. Syedda Tahreem Zahra, Engr. Tayyaba Nosheen

BSc Electrical Engineering Program

The Bachelor of Science in Electrical Engineering is a comprehensive undergraduate program that encompasses a wide range of subjects, such as Digital and Analog Electronics, Electromagnetic Field, Control Systems, Communication Systems, and Power Engineering. The program is supported by well-equipped laboratories and highly qualified faculty within 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:

Candidates having a minimum 60% marks in any of the following are eligible to apply in Electrical Engineering

1. FSc (Pre-engineering)
2. ICS (Intermediate in Computer Science)
3. DAE in relevant field.
4. A Levels (IBCC Equivalence Required)

Duration:

4 years (8 semesters)

Internships:

Internship is the requirement of the degree

Selection Criteria:

- Candidates are required to take the entry test as per PEC policy.
- Merit list will be finalized on the basis of 33% marks in entry test, 50% marks obtained in FSc/ DAE/A-level & 17% of interview as per PEC policy.

Interview:

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

Talent Scholarships for 1st Semester of Electrical Engineering

Marks Obtained in Intermediate Annual/Percentage based system	Scholarship on 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%

Degree Awarding Criteria:

Degree will be awarded to the students on fulfillment of the following two conditions:

- 1) Completion of the program with min CGPA = 2.0
- 2) Attainment of 12 PLOs of the program as per approved KPI

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-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-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-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-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-204	Pakistan Studies	2	0	2
BS-212	Complex Variables and Transforms	3	0	3
Total Semester Credit Hours		14	3	17

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
HU-302	Revealed Sciences	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-403	Entrepreneurship	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
MS-401	Engineering Management	3	0	3
HU-401	Islamic Ethical Principles	2	0	2
EE-416	Elective-VII	3		
EEL-416	Elective-VII		1	4
EE-415	Elective VI		3	
EEL-415	Elective VI		1	4
Total Semester Credit Hours		8	8	16

* 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 and 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.

Electrical Machines and Power Systems and Lab: This 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, singlephase induction motor, single-phase transformer, threephase induction motor, three-phase synchronous motor and three-phase transformer. This lab will also provide the fundamental & advance concepts over Power Power Systems, especially, Power Transmission, Power Distribution & utilization.

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.

Undergraduate Alumni

Engr. Zeeshan Mustafa

Graduated 2018-BSc Electrical Engineering

Assalam u Alikum! I am Zeeshan Mustafa and I have completed my bachelors in Electrical Engineering from Riphah International University.



My experience at Riphah was phenomenal. Riphah was such a nice institute that provides full time education services in a very good environment. No doubt faculty is great, not only in teaching you the subject but they make you a better person. The best thing was Riphah International University provides me fully funded scholarship to fulfill my dreams and help me to manage my finances and studies effectively.

At the end I would like to say thanks to Riphah International University and my all respectful teachers who helped me to find my interests and encouraged me to fully explore my potential and shaped the person I am today.

Engr. Urooj Amin Khan

Graduated Fall 2018 BSc Electrical Engineering

Choosing this field which is dominated by majority of male students has given me confidence being among the few of the female students who has been given opportunity to be selected in electrical engineering. Our university has never offended us that female can't move in this field, rather our faculty members have given confidence and supported us in terms of academic and professional skills.



Mentoring class had been conducted in our department to help us how to be confident and be ethical in our field, also in our daily life.

So being thankful to Riphah International University and mostly to our faculty members for supporting us morally and given confidence to further pursue in the field of electrical engineering.

Thankyou!

Engr. Rana Hassan bin Tariq

Graduated 2018-BSc Electrical Engineering

Choosing Riphah international university Islamabad was one of the best decisions I have ever made. At this institute I gained friendship and experiences which added a different perspective to my life. It feels great to be taught by amazing teachers who are the best.



They always motivated and encouraged me to face the risks and learn new things. I am and will always be thankful to Riphah for making me a person I am today. Riphah has provided me an opportunity and such academic excellence which help me to explore my capabilities.

Engr. Khadija Aqeel

Graduated 2018-BSc Electrical Engineering

Assalam u Alaikum!

I am Khadija Aqeel and I did my bachelor's in electrical engineering from Riphah international university Islamabad. Doing bachelor's from this university has brought a vast change in my personality. It has brought self confidence in me, determination and passion towards my field. I had learnt a lot during these four years of my academic life.



The department was so much cooperative and I also got 100% scholarship throughout my degree. Moreover, the environment in Riphah international university is very friendly, safe and different from other universities which is very important for the students. My success credit goes to my teachers. Thank you!

MS Electrical Engineering Program

This program entails advanced courses, and upon successful completion of 32 credit hours, including 26 credit hours of coursework and 6 credit hours dedicated to a research thesis, students are awarded a

Master's degree. To fulfill the coursework requirement, students have the flexibility to select courses from the available subjects offered during each 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.
- Graduates from other engineering/sciences/ technology disciplines or 16-year degree in Computer Science, Electronics, Physics or any related discipline may be eligible for this program, subject to passing the prerequisite courses with minimum GPA 2.0 of 4.0 in each course.

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 (MS Electrical Engineering)

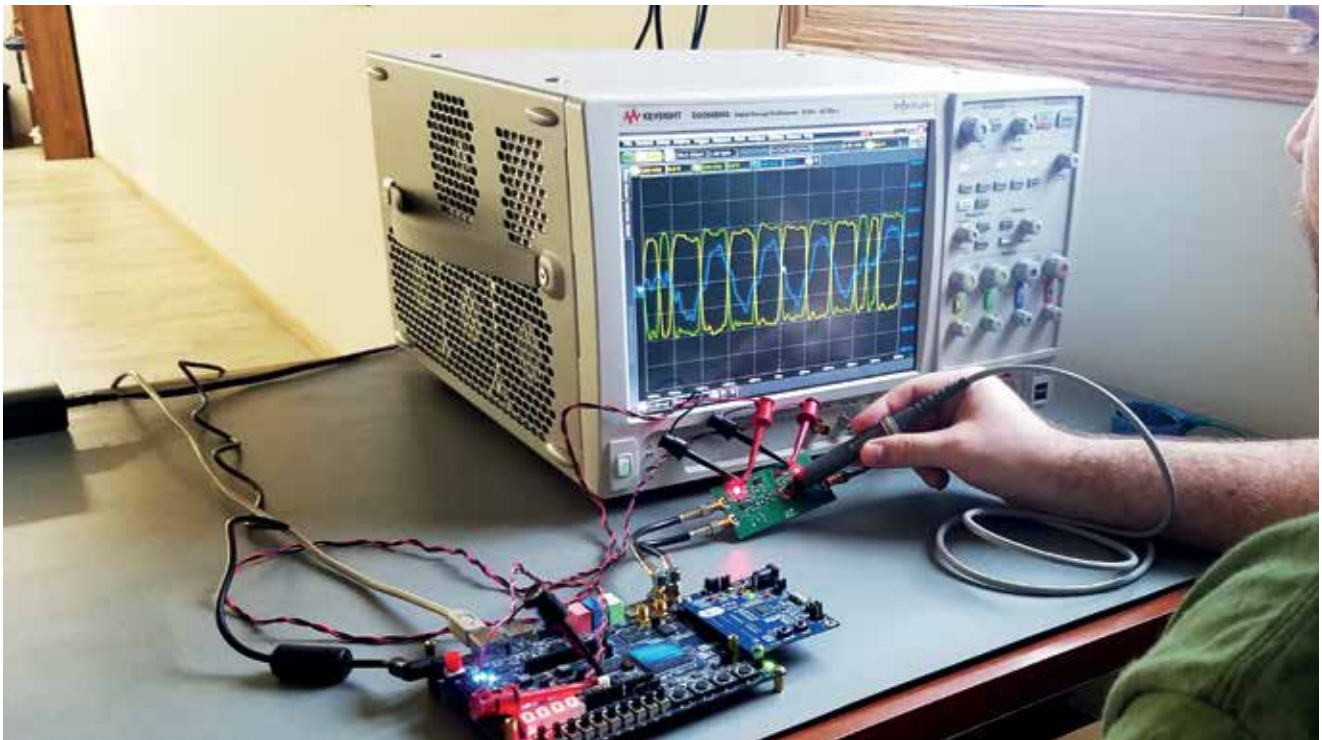
Code	Subject	Credit Hours	Elective/ Core
UR711	Ethics in Practice I	1 + 0	Compulsory
UR712	Ethics in Practice II	1 + 0	Compulsory
EE5001	Linear Systems Theory & Design	3 + 0	Elective
EE5002	Stochastic Processes	3 + 0	Core
EE5003	Modeling and Simulation of Dynamic Systems	3 + 0	Elective
EE5004	Basics of Inertial Navigation	3 + 0	Elective
EE5005	Introduction to Navigation Systems	3 + 0	Elective
EE5006	Introduction to Guidance & Control of Aerospace Systems	3 + 0	Elective
EE5007	Advanced Digital Signal Processing	3 + 0	Core
EE5008	Biomedical Signal Processing	3 + 0	Elective
EE5009	Advanced Digital Image Processing	3 + 0	Elective
EE5010	Video Signal Processing	3 + 0	Elective
EE5011	Speech Processing and Coding	3 + 0	Elective
EE5012	Wavelets and Transform Methods	3 + 0	Elective
EE5013	Advanced Optoelectronics	3 + 0	Elective
EE5014	ASIC for Digital Signal Processing	3 + 0	Elective
EE5015	Advanced Microelectronics	3 + 0	Elective
EE5016	Advanced Digital Design	3 + 0	Elective
EE5017	Photonic Devices	3 + 0	Elective
EE5018	Introduction to Big Data & Deep Learning in HPC (Big Data Analytics)	3 + 0	Elective
EE5019	Advanced Digital Communication	3 + 0	Elective
EE5020	Multimedia Communications	3 + 0	Elective
EE5021	RF Circuit Theory	3 + 0	Elective
EE5022	Secure Communications	3 + 0	Elective
EE6001	Advanced Digital Control Systems	3 + 0	Elective
EE6002	Embedded Control Systems	3 + 0	Elective
EE6003	Linear Multivariable Systems	3 + 0	Elective
EE6004	Non-Linear Systems	3 + 0	Elective
EE6005	Stochastic Estimation and Control	3 + 0	Elective
EE6006	Adaptive Control	3 + 0	Elective
EE6007	Optimal Control	3 + 0	Elective
EE6008	Intelligent Control	3 + 0	Elective

Code	Subject	Credit Hours	Elective/ Core
EE6009	Special Topics in Control	3 + 0	Elective
EE6010	Robust Control Systems	3 + 0	Elective
EE6011	Integrated Navigation Systems	3 + 0	Elective
EE6012	Computer Vision	3 + 0	Elective
EE6013	Adaptive Signal Processing	3 + 0	Elective
EE6014	ASIC for Digital Signal Processing	3 + 0	Elective
EE6015	Real-Time and Multi-rate Systems	3 + 0	Elective
EE6016	Real-Time System Design and Analysis	3 + 0	Elective
EE6017	Neural Systems and Networks	3 + 0	Elective
EE6018	Detection & Estimation	3 + 0	Elective
EE6019	Artificial Intelligence Based Systems	3 + 0	Elective
EE6020	Machine Learning	3 + 0	Core
EE6021	Advanced Computer Architecture	3 + 0	Elective
EE6022	Digital System Design and Microprocessor Architecture	3 + 0	Elective
EE6023	Multi-Core System Architecture	3 + 0	Elective
EE6024	Programming of Multi-core Architectures	3 + 0	Elective
EE6025	Parallel Programming Models	3 + 0	Elective
EE6026	Advanced Semiconductor Device Physics	3 + 0	Elective
EE6027	Special Topics in Digital Communications	3 + 0	Elective
EE6028	Embedded Systems & Applications	3 + 0	Elective
EE6029	Advanced Mobile & Satellite Communication	3 + 0	Elective
EE6030	Advanced Telecommunications Networks	3 + 0	Elective
EE6031	Advanced Computer Networks	3 + 0	Elective
EE6032	Advanced Antenna Theory	3 + 0	Elective
EE6033	Engineering Operations	3 + 0	Elective
EE6034	Microwave Filters	3 + 0	Elective
EE6035	Advanced Microwave Engineering	3 + 0	Elective
EE 6036	RENEWABLE ENERGY SYSTEMS	3 + 0	Elective
EE7100	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 two 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 three years at the university campus and publishing at least two 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.
- Graduates from other engineering/sciences/ technology disciplines or 18-year degree in Computer Science, Electronics, Physics or any related discipline may be eligible for this program, subject to passing the prerequisite courses with minimum GPA 3.0 of 4.0 in each course.

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 (PhD Electrical Engineering)

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

Code	Subject	Credit Hours	Elective/ Core
EE8014	ASIC for Digital Signal Processing	3 + 0	Elective
EE8015	Real-Time and Multi-rate Systems	3 + 0	Elective
EE8016	Real-Time System Design and Analysis	3 + 0	Elective
EE8017	Neural Systems and Networks	3 + 0	Elective
EE8018	Detection & Estimation	3 + 0	Elective
EE8019	Artificial Intelligence Based Systems	3 + 0	Elective
EE8020	Machine Learning	3 + 0	Elective
EE8021	Advanced Computer Architecture	3 + 0	Elective
EE8022	Digital System Design and Microprocessor Architecture	3 + 0	Elective
EE8023	Multi-Core System Architecture	3 + 0	Elective
EE8024	Programming of Multi-core Architectures	3 + 0	Elective
EE8025	Parallel Programming Models	3 + 0	Elective
EE8026	Advanced Semiconductor Device Physics	3 + 0	Elective
EE8027	Special Topics in Digital Communications	3 + 0	Elective
EE8028	Embedded Systems & Applications	3 + 0	Elective
EE8029	Advanced Mobile & Satellite Communication	3 + 0	Elective
EE8030	Advanced Telecommunications Networks	3 + 0	Elective
EE8031	Advanced Computer Networks	3 + 0	Elective
EE8032	Advanced Antenna Theory	3 + 0	Elective
EE8033	Engineering Operations	3 + 0	Elective
EE8034	Microwave Filters	3 + 0	Elective
EE8035	Advanced Microwave Engineering	3 + 0	Elective
EE 8036	RENEWABLE ENERGY SYSTEMS	3+0	Elective
EE8100	PhD Thesis	30	Thesis



RESEARCH GROUPS (ELECTRICAL ENGINEERING)

“ ADVANCED COMPUTING IN FUTURE TECHNOLOGY (ACFT)

Team Lead: Prof. Dr. Jameel Ahmed

Members: Dr. Shaheryar Najam, Shahzad Iqbal, Mena Nawaz, Fadia Ali Khan

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, amplification of MEMS based micro-gripper and advanced encryption/decryption schemes for data security. ”

“ MICROWAVE AND MILLIMETER RESEARCH CENTER (MMRC)

Team Lead: Assoc. Prof. Dr. Sohail Khalid

Members: Dr. Muhammad Faisal, Bilal Mushtaq, Abdul Rehman, Muhammad Idrees, Nayab Gogosh

The focus of this research group centers around the synthesis and design of microwave and millimeter wave devices, encompassing a range of components such as Antennas, Filters, Multiplexers, and Power Amplifiers. Additionally, a primary research area of interest within this group revolves around the development of body antenna systems specifically tailored for low-powered wireless medical devices. Furthermore, the group is actively engaged in the design of innovative multilayer microstrip structures for antennas and filters. ”

“ COMPUTER AND INFORMATION SCIENCE (CIS)

Team Lead: Dr. Shaheryar Najam

Members: Tahseen Ahsan, Kiran Ashraf, Abrar, Ishfaq Ahmed, Muhammad Ali, Talha Asghar, Mehwish, Gulraiz Khan, Azam Khan, Iftikhar Ahmad, Waqas Ahmad, Mubashir Qureshi

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, ongoing projects aims at early diagnosis of chronic disease linked with vital body organs such as liver, lung, and kidney using Machine Learning/Deep Learning, Non-invasive estimation of Blood glucose level and Blood Pressure using PPG signals, design and development of digital stethoscope, and securing sensitive information such as medical and military-related images that requires the highest level of confidentiality particularly during transmission and storage. ”

“ SIGNAL PROCESSING FOR OPTICAL AND BIOMEDICAL SENSORS (SPOB)

Team Lead: Dr. Zohaib Ahmad Khan

Members: Dr. Faraz Akram, Dr. Saqib Amin, and Muhammad Sadiq

Mission: Our research group specializes in developing cutting-edge signal processing algorithms for self-mixing laser interferometry (SMI) based sensing applications. We are focused on enhancing the accuracy and reliability of SMI sensors by implementing pre-processing techniques and retrieving critical information about optical feedback parameters. Our team is also dedicated to developing adaptive SMI sensors that can be applied in industrial or embedded settings. In addition to our work with optical sensors, we are committed to advancing the field of biomedical sensing by designing novel pre-processing techniques for all bio-potential signals. With a focus on innovation and collaboration, the SPOB Research Group is dedicated to advancing the frontier of signal processing for a variety of applications. ”

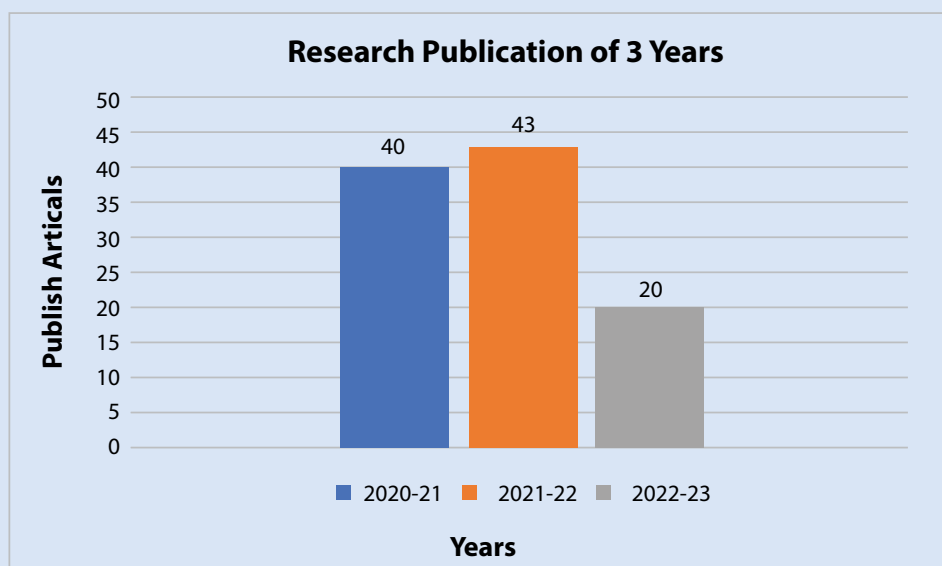
PhD Alumni, Electrical Engineering Department

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	2	Dean, AJK University
2	Dr. Shaheryar Najam	PhD Electrical Engineering	4.00/4.00	2021	Prof. Dr Jameel Ahmed	3	Assistant Professor & Postgraduate Incharge Riphah International University, Islamabad
3	Dr. Zohaib Ahmad Khan	PhD Electrical Engineering	3.83/4.00	2021	Prof. Dr. Tassadaq Hussain	3	Assistant Professor Department of Electrical Engineering Riphah International University, Islamabad
4	Dr. Mujeeb Ur Rehman	PhD Electrical Engineering	4.40/4.00	2022	Assoc. Prof. Dr. Sohail Khalid	5	Lecturer, School of Science Technology and Health York St John University, York, U.K.
5	Dr. Muhammad Faisal	PhD Electrical Engineering	3.92	2023	Assoc. Prof. Dr. Sohail Khalid	2	Sr. Lecturer Department of Electrical Engineering Riphah International University, Islamabad
6	Dr. Saqib Amin	PhD Electrical Engineering	3.65/4.00	2022	Prof. Dr. Tassadaq Hussain	3	Sr. Lecturer Department of Electrical Engineering Riphah International University, Islamabad
7	Dr. Arslan Shafique	PhD Electrical Engineering	3.81/4.00	2022	Prof. Dr. Jameel Ahmed	3	Research Associate, Glasgow Caledonian University, UK

Funded Final-Year-Projects (FYPs), Electrical Engineering Department (2022-2023)

S.No	Title of Funded FYP	Funding Body	Project Supervisor	Funding Amount of Project (PKR)	Year	Completion Status
1.	Automatic Fire Detection and Fire Fighting Drone Using Deep Learning	"Ignite / NGIRI"	Dr. Shahreyar Najam	0.07 Million	2023	Completed
2.	Design and Development of AI Based System for Early Diagnosis of Cardiopulmonary diseases	"Ignite / NGIRI"	Dr. Sohail Khalid	0.07 Million	2023	Completed
3.	Power Generation from Inorganic Waste Material	"Ignite / NGIRI"	Engr. Syeda Tahreem Zahra	0.075 Million	2023	Completed
4.	Design and Development of Non-invasive device of blood glucose level	"Ignite / NGIRI"	Dr. Shahreyar Najam	0.07 Million	2023	Completed
5.	Solar Powered Smart Irrigation Systems	"Ignite / NGIRI"	Engr. Muhammad Sadiq Orakzai	0.068 Million	2022	Completed
6.	Smart Electronic Voting Machine	"Ignite / NGIRI"	Engr. Adil Zohaib	0.075 Million	2022	Completed
7.	Design and Fabrication of Electric Bike	"Ignite / NGIRI"	Engr. Muhammad Farrukh Qureshi	0.08 Million	2022	Completed
8.	Onboard Integrated Charger for Electric Vehicle using MMC	"Ignite / NGIRI"	Engr. Muhammad Farrukh Qureshi	0.08 Million	2022	Completed
9.	Unmanned Aerial Vehicle for Pesticide Spraying	"Ignite / NGIRI"	Engr. Muhammad Farrukh Qureshi	0.08 Million	2022	Completed
10	Reactive Power Compensastion Using FACTS Devices	"Ignite / NGIRI"	Dr. Saqib Amin	0.07 Million	2022	Completed

SUMMARY OF RESEARCH PUBLICATIONS (ELECTRICAL ENGINEERING DEPARTMENT)



Graduate Alumni

Dr. Fadia Ali Khan

PhD Electrical Engineering



About Riphah:

As an Electrical Engineering PhD graduate from Riphah International University, I am proud to be an alumnus of the program. The university provided exceptional education, research opportunities, and supportive faculty. The state-of-the-art facilities and emphasis on practical application prepared me for the industry. The university's focus on ethical values and professional development shaped my character.

The diverse and inclusive environment fostered collaboration and learning from fellow students. The strong alumni network facilitated networking and mentorship opportunities. Overall, Riphah International University's transformative experience equipped me with the knowledge, skills, and values for professional success. I highly recommend the university to aspiring students in Electrical Engineering or other fields offered by the institution.

Dr. Asif Siddiq

PhD Electrical Engineering



About Riphah:

As a Ph.D. alumnus of Riphah International University, I am proud to share my positive experience and thoughts about the university. Riphah International University is renowned for its commitment to providing quality education, promoting research excellence, and nurturing ethical and professional values among its students.

During my time at Riphah, I found the faculty to be highly knowledgeable and experienced in their respective fields. They were not only experts in their subjects but also dedicated mentors who guided and supported me throughout my academic journey. The university's emphasis on research and innovation encouraged me to explore new horizons and contribute to the body of knowledge in my area of specialization.

I am grateful for the education and opportunities I received at Riphah International University, and I believe that it continues to uphold its reputation as a leading institution in providing quality education and producing graduates who make a positive impact in their respective fields.

Ms. Mehwish

MS Electrical Engineering



About Riphah:

It was a great experience for me to complete my Master's degree from Riphah University. I am immensely grateful to my university for providing me with an exceptional learning experience during my master's degree. The faculty's expertise, the well-rounded curriculum, and the vibrant academic environment truly enriched my educational journey.

Ms. Irsa Jamil

MS Electrical Engineering



About Riphah:

Riphah International University's MS program in Electrical Engineering is a testament to academic excellence and practicality. The knowledgeable faculty, cutting-edge research facilities, and well-designed curriculum equip students with the skills and expertise needed to tackle real-world challenges.

The emphasis on hands-on training, industry collaborations, and technological advancements creates a dynamic learning environment. Riphah International University's commitment to fostering innovation, critical thinking, and ethical conduct sets the foundation for success in the ever-evolving field of electrical engineering.



Department of
Biomedical Engineering

HoD's Message



It is with great pleasure that I welcome you to the Department of Biomedical Engineering at our esteemed university. As the Head of Department, it is my honor to introduce you to an exciting and transformative field that combines the principles of engineering and medicine to improve healthcare outcomes and enhance the quality of life for individuals worldwide.

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. At our university, we take pride in offering a comprehensive and cutting-edge program in Biomedical Engineering, designed to equip our students with the knowledge, skills, and hands-on experience necessary to excel in this rapidly evolving field. Our dedicated faculty members, renowned for their expertise and research contributions, are committed to providing a stimulating and nurturing learning environment.

Throughout your journey in our Biomedical Engineering department, you will have the opportunity to explore a diverse range of topics, including biomedical instrumentation, biomaterials, biomechanics, medical imaging, artificial intelligence, and more. Our curriculum is carefully crafted to blend theoretical knowledge with practical applications, ensuring that you develop a strong foundation in engineering principles while understanding the intricacies of the human body and healthcare systems.

As a student in our program, you will have access to state-of-the-art laboratories, research facilities, and collaborative spaces that foster innovation and creativity. We encourage our students to actively engage in hands-on projects, internships, and research endeavors, enabling you to apply your classroom knowledge to real-world challenges. Additionally, our department maintains strong ties with industry partners and healthcare institutions, providing valuable networking opportunities and internships that can pave the way for exciting career prospects.

Beyond academics, we emphasize the holistic development of our students. Through our vibrant student organizations and extracurricular activities, you will have the chance to connect with like-minded individuals, participate in community outreach programs, and attend seminars and conferences that expose you to the latest advancements in Biomedical Engineering. We believe in nurturing well-rounded individuals who possess not only technical proficiency but also strong leadership, communication, and teamwork skills.

I invite you to join our dynamic and diverse community of scholars, researchers, and learners, where you will be supported and inspired to reach your full potential. Together, let us embark on a journey of discovery, innovation, and service to humanity through the fascinating realm of Biomedical Engineering.

I look forward to welcoming you to our Department of Biomedical Engineering at Riphah.

(Dr. Faraz Akram)

Assistant Professor & HoD , Department of Biomedical Engineering

FACULTY, DEPARTMENT OF BIOMEDICAL ENGINEERING

Dr. Faraz Akram

Designation: Assistant Professor & HoD
Qualification: PhD Biomedical Engineering, KYUNG HEE UNIVERSITY, Republic of Korea
Area of Interest: Brain Computer Interface, Biomedical Signal Processing, Digital Image Processing
Contact: faraz.akram@riphah.edu.pk, +92 (51) 844600 Ext: 297

Dr. Zia ur Rehman

Designation: Assistant Professor
Qualification: Postdoc: Industrial Bioengineering, Universita campus biomedico di roma, Rome Italy
Ph.D Robotics and Intelligent Machine learning, NUST – AAU Denmark
Area of Interest: Myoelectric Control, robotic TMS, Deep/machine learning medical Signals and Image processing
Contact: ziaur.rehman@riphah.edu.pk, +92 (51) 844600 Ext: 322

Dr. Saadullah Farooq Abbasi

Designation: Assistant Professor
Qualification: PhD in Biomedical Engineering, Fudan University, Shanghai, China.
Area of Interest: Neural networks, Artificial intelligence, image encryption, signal processing, machine and deep learning.
Contact: su.farooq@riphah.edu.pk

Engr. Faisal Amin

Designation: Senior Lecturer
Qualification: MS Biomedical Engineering, NUST, Pakistan
Area of Interest: Biomaterials/Prostheses, Biomedical Instrumentation, Rehabilitation Engineering
Contact: faisal.amin@riphah.edu.pk, +92 (51) 844600 Ext: 219

Engr. Sehrish Shafqat

Designation: Senior Lecturer
Qualification: MSc Engineering Management, UET Lahore, Pakistan
Area of Interest: Biomedical Materials, Biochemistry, Thermodynamics, Entrepreneurship, Management and Practices
Contact: sehrish.shafqat@riphah.edu.pk, +92 (51) 844600 Ext: 370

Engr. Mashal Fatima

Designation: Lecturer
Qualification: MS Biomedical Engineering, Riphah International University, Islamabad, Pakistan
Area of Interest: Brain Computer Interface, Biomedical Signal Processing, Bio-instrumentation
Contact: mashal.fatima@riphah.edu.pk, +92 (51) 844600 Ext: 370

Engr. Hamza Toor

Designation: Lecturer
Qualification: MS Biomedical Engineering, Riphah International University Islamabad, Pakistan
Area of Interest: Biomedical Imaging
Contact: hamza. toor@riphah.edu.pk, +92 (51) 844600 Ext: 274

Engr. Abdul Qadeer Khan

Designation: Lecturer
Qualification: MS Biomedical Engineering, Riphah International University, Islamabad
Area of Interest: Biomedical Instrumentation, Signal Processing
Contact: abdul.qadeer@riphah.edu.pk, +92 (51) 844600 Ext: 297

Dr. Sara Rehman

Designation: Lecturer
Qualification: Bachelor of Medicine, Bachelor of Surgery
Area of Interest: Biomedical Instrumentations
Contact: sarah.rehman@riphah.edu.pk

Engr. Abdul Malik Muhammad

Designation: Lecturer
Qualification: Masters in Biomedical Engineering, Riphah International University, Islamabad, Pakistan
Area of Interest: Image processing and Biomedical Instrumentation.
Contact: abdul.malik@riphah.edu.pk

Engr. Syed Muddasir Hussain

Designation: Lecturer
Qualification: Masters in Biomedical Engineering, Sir Syed university of Engineering and Technology, Pakistan
Area of Interest: Image processing and Biomedical Instrumentation.
Contact: muddasir.hussain@riphah.edu.pk

Engr. Touseef Yaqoob Bhatti

Designation: Lecturer
Qualification: Master in Electricdal Engineering, Information Technology University of Pakistan
Area of Interest: Bio-signals Processing and AI for Healthcare
Contact: hamza. touseef.yaqoob@riphah.edu.pk

Engr. Shoaib Zafar

Designation: Lab Engineer
Qualification: BSc Biomedical Engineering, Riphah International University, Islamabad
Area of Interest: Instrumentation, Biomecahnics
Contact: shoaib.zafar@riphah.edu.pk

Engr. Muhammad Shakeel Ishtiaq

Designation: Lab Engineer
Qualification: B.Sc. Biomedical Engineering, Riphah International University
Area of Interest: Electronics, Signal processing
Contact: shakeel.ishtiaq@riphah.edu.pk

Engr. Muhammad Falak Anjum

Designation: Lab Engineer
Qualification: B.Sc. Biomedical Engineering, Riphah International University
Area of Interest: Artificial Intelligence and programming
Contact: falak.anjum@riphah.edu.pk

Engr Muhammad Ayub Khan

Designation: Lab Engineer
Qualification: MS in electrical engineering
Area of interest: Instrumentation
Contact: ayub_electronics@yahoo.com

Engr Syeda Rida Zehra

Designation: Lab Engineer
Qualification: B.Sc. Biomedical Engineering, Riphah International University
Area of interest: BCI, neurorehabilitation Biomedical Instrumentation
Contact: rida.zehra@yahoo.com

Coordination Office**Anjum Iqbal Khattak**

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

Faculty, Department of Biomedical Engineering



L to R Sitting: Engr. Hamza Toor, Dr. Faraz Akram (HoD, BME Dept), Prof. Dr. Jameel Ahmed (DEAN, FEAS), Dr. Zia ur Rehman, Dr. Saadullah Farooq Abbasi

L to R Standing: Engr. Abdul Malik Muhammad, Muhammad Sajawal Khan, Engr. Muhammad Ayub Khan, Muhammad Kamran, Engr. Shoaib Zafar, Engr. Muhammad Falak Anjum, Engr. Muhammad Shakeel Ishtiaq, Engr. Faisal Amin, Engr. Abdul Qadeer Khan, Engr. Syed Muddasir Hussain, Engr. Mariyam Nadeem, Engr. Syeda Rida Zahra, Engr. Mashal Fatima

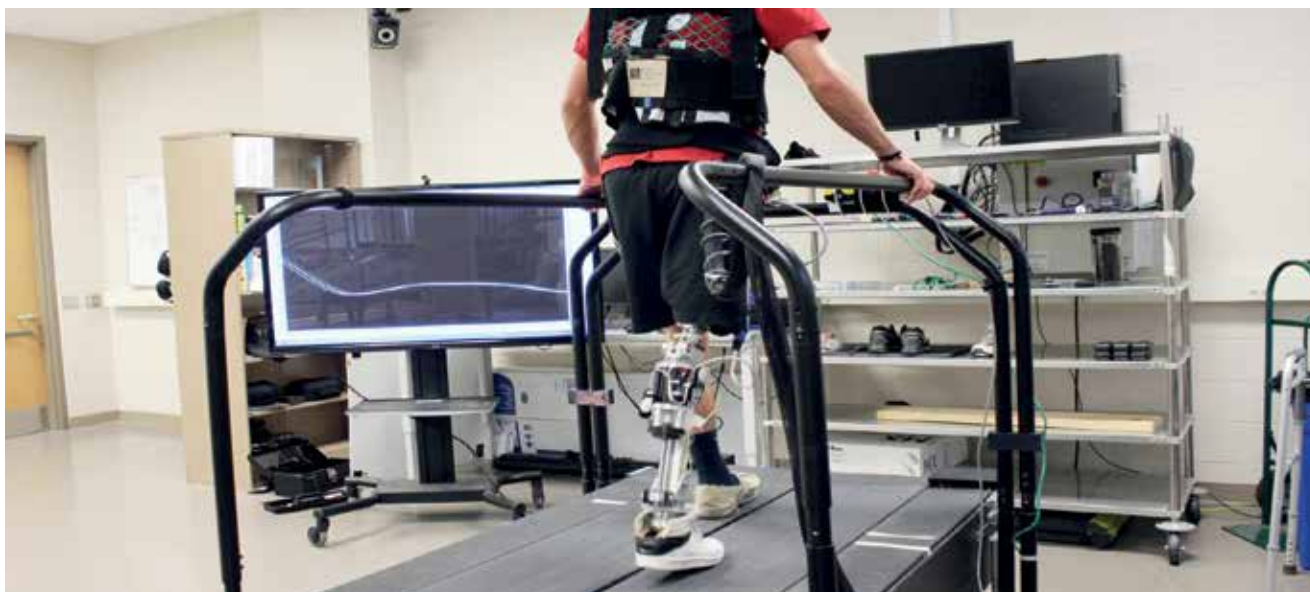
BSc Biomedical Engineering Program

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:

Candidates having a minimum 60% marks in any of the following are eligible to apply in Biomedical Engineering

1. F.Sc Pre-medical or Pre-engineering
2. ICS (Intermediate in Computer Science)
3. DAE in relevant field.
4. A Levels

Duration:

4 years (8 semesters)

Internships:

Internship is requirement of degree

Selection Criteria:

- Candidates are required to take entry test as per PEC policy.
- Merit list will be finalized on the basis of 33% marks in entry test, 50% marks obtained in FSc/ DAE/A-level and 17% interview as per PEC policy.

Interview:

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

Talent Scholarships for 1st Semester Biomedical Engineering

Marks in Previous Degree	
% age of marks Obtained in Intermediate (Annual/Percentage based system)	Scholarship (% age of Tuition Fee)
90% and above	75%
80% to 89.99%	50%
75% to 79.99%	30%
70% to 74%	20%

Degree Awarding Criteria:

Degree will be awarded to the students on fulfillment of the following two conditions:

- 1) Completion of the program with min CGPA = 2.0
- 2) Attainment of 12 PLOs of the program as per approved KPI

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 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 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 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 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 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 Engineering 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 Engineering 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 3

Biomedical computing

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

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



Undergraduate Alumni

Engr. Rida-e-Tahira

In addition to the exceptional academic program, the Department of Biomedical Engineering at Riphah International University offers a supportive and inclusive community that fosters personal growth and collaboration. Through mentorship programs, industry partnerships, and alumni networks, Riphah ensures that their students receive the guidance and opportunities needed to excel in their chosen careers. As ambassadors of Biomedical Engineering, let us forge paths of progress, advancing technologies, and improving lives. Together, we honor our roots, inspire future generations, and forever remain a vital part of the extraordinary legacy of Riphah.



Engr. Muhammad Omar Cheema

As an esteemed alumnus and gold medalist from Riphah International University's Biomedical Engineering Department, I am proud to have been a part of this exceptional institution. The department's commitment to academic excellence and ethical values sets it apart. The rigorous curriculum and state-of-the-art laboratories provided me with a strong theoretical foundation and practical skills. Collaborating with diverse peers fostered a stimulating learning environment. I am grateful for the transformative education and the opportunity to make a positive impact in healthcare through Riphah University's Biomedical Engineering Department.



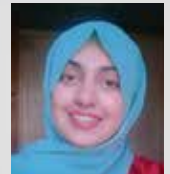
Engr. Muhammad Fahad Shakeel

Riphah International University provided an environment where students can easily be motivated to do best in their studies alongwith a focus on the co-curricular and extra-curricular activities.



Engr. Memoona Ghayyas

As a recent graduate of Riphah International University's BSc Biomedical Engineering program, I am incredibly grateful for the transformative impact it has had on my academic and professional journey. The program's comprehensive curriculum provided me with a solid foundation in the principles of engineering and their application in the field of healthcare. The faculty members were dedicated mentors, offering exceptional support and guidance that nurtured my critical thinking abilities and encouraged me to push my boundaries. Through practical learning experiences, I gained invaluable hands-on skills that have greatly boosted my confidence in tackling real-world challenges. With the knowledge and experiences gained at Riphah University, I feel well-equipped and excited to embark on a promising career in the ever-evolving field of biomedical engineering.



Laboratories

Electronics Lab 1: 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.



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.



Instrumentation and Control Lab: The biomedical Instrumentations lab is highly equipped with all the Sensors and Instrumentations of the Therapeutic machines. The lab infrastructure has Instrumentation trainers for Biopotential Signals acquisition. The Work Station is provided with EEG-LAB, Open –BCI Software, and LabVIEW.



Project Lab: After learning the different practical approaches of biomedical engineering students are required to apply them in real-time analysis and problem-solving. This brings them to a dedicated project lab which is well equipped with all the necessary units to facilitate them in the implementation of concepts learned in course labs. Here, they the body signals, design circuits, acquire data, and analyse them using software tools to get a complete insight into what they have learned.



Physiology Lab and Human Anatomy: Human Anatomy and Human Physiology lab are well equipped with all the anatomical structures of the human body and other biological structures where students can thoroughly visualize and comprehend the structural aspects related to Biomedical Engineering. Moreover, it is also comprised of basic software tools like Human Torso, MATLAB, and LabVIEW that can aid students to look into the structures deeply and run the simulations to study the work patterns that are essential aspects to learn anatomy/Physiology in an effective manner.



Applied Physics and Biomaterials: Biomaterials are very important biomedical components as they work to make up the life structures and bear the dependency on the normal functioning of living bodies. They play a role in manufacturing the basic materials that can act as building blocks for the body. Students in this lab can work to design models based on biomaterials and also validate the applications of Biomaterials as building blocks of the body.



Biomechanics: This lab also holds immense importance in the department of Biomedical Engineering. The rehabilitation domain works in parallel with the Biomechanics branch of Biomedical Engineering. Here students are provided with the opportunities to learn the basic actions of the body in relation to the movements associated with it. All these activities are performed within the domain of Force that is either applied to the body or applied by the body. It is equipped with all the modern tools for rehabilitation like prosthesis, orthosis, treadmill, exercise equipment, measuring devices such as Force plates, Pasco hardware, and mechanical models of body structure. Moreover, the virtual tools available are also the positive points of this learning site.



Biochemistry: Biochemicals are regarded as essential ingredients to the recipe of life. Their concentrations, availability, production rates, and other factors ensure the smooth working of life systems. To make the students familiar with the biochemical approach of life units, a well-equipped Biochemistry lab is available where students can study and perform the different aspects of biochemistry related to Biomedical Engineering and enhance their knowledge about their work patterns, ratios, and responses in different conditions.



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.
- Internship is a mandatory requirement for the completion of the degree.

Duration:

Minimum 1.5 years & Maximum 4 years

Selection Criteria:

Marks in Relevant Engineering Program	50%
Entry Test/ Interview	33%
Interview	17%

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 and 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 CGPA 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 three years at the university campus and publishing at least two research papers 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)



BIOSIGNAL PROCESSING

Team Lead: Dr. Faraz Akram

Members: Muhammad Zia Ur Rehman, Hamza Toor, Falak Anjum, Shakeel Ishtiaq, Abdul Qadeer Khan

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



BIOMEDICAL INSTRUMENTATION

Team Lead: Dr. Saad Ullah Farooq Abbasi

Members: Mashal Fatima, Hamza Toor, Mudassir Hussain, Mariyam Nadeem, Syeda Rida Zahra

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



BIOMECHANICS

Team Lead: Dr. Muhammad Zia Ur Rehman

Members: Faisal Amin, Ayub Khan, Dr. Sara Rehman, Shoaib Zafar, Abdul Malik Muhammad

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:

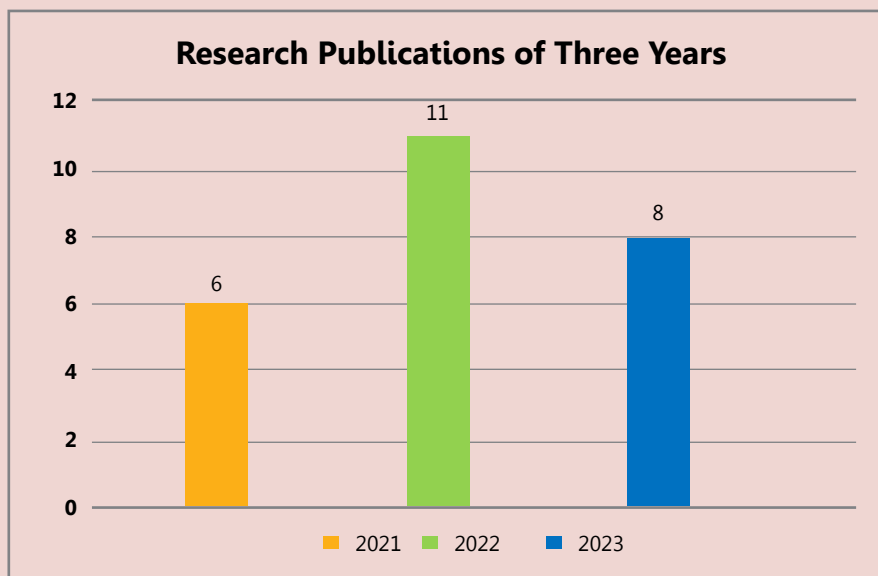
- Footwear Affects Biomechanical Work and Knee Adduction Moment during Stance Phase in Medial Knee Osteoarthritic Male Pakistani Adults
- Pushing a Manual Wheelchair Requires More Muscular Force than Pulling
- Effect of toe-out and toe-in postures on static standing balance
- Effect of bunion on plantar pressure distribution



Funded Final-Year-Projects (FYPs), Biomedical Engineering Department (2022-2023)

S.No	Title of Funded FYP	Funding Body	Project Supervisor	Funding Amount of Project (PKR)	Year	Completion Status
1	Automatic Detection of ABO Rh Blood Typing	Ignite/NGIRI	Engr. Mudassir Hussain	0.071 Million	2023	Completed
2	Design and Development of mental stress measuring device	Ignite/NGIRI	Dr. Muhamamd Shafique	0.075 Million	2023	Completed
3	Development of AI Algorithm and Sensor optimization to convert Urdu Sign language Gestures to Speech	Ignite/NGIRI	Dr. Faraz Akram	0.072 Million	2023	Completed
4	Design and Development of Embedded System fro wearable sensors to convert Urdu Sign language gestures to speech	Ignite/NGIRI	Dr. Faraz Akram	0.065 Million	2023	Completed
5	Design and Development of Vital Parameter Patient Monitor	Ignite/NGIRI	Engr.Faisal Amin	0.052485 Million	2,022	Completed
6	Development of Infusion System for Controlled Drug Delivery	Ignite/NGIRI	Engr.Faisal Amin	0.04729 Million	2,022	Completed
7	Development of Mechanoreceptors using Nanofibers for Artificial Skin	Ignite/NGIRI	Engr. Pertab Rai	0.072428 Million	2,022	Completed

SUMMARY OF RESEARCH PUBLICATIONS (BIOMEDICAL ENGINEERING DEPARTMENT)



Graduate Alumni

Engr. Rida Nisar

About Riphah:

My journey at Riphah International University began back in 2014 when I started to study my Bachelor of Biomedical Engineering. I chose to return to RIU for Masters in Biomedical Engineering because I knew I would get the support I needed to balance my studies in my already busy life. My teachers supported me and helped get to where I am now and where I'll be going in the future.



Engr. Hamza Bin Zafar

About Riphah:

Riphah International University's MS program in Biomedical Engineering offers a remarkable blend of academic rigor and practical application. The faculty's expertise, state-of-the-art research facilities, and comprehensive curriculum provide a nurturing environment for innovation and discovery. The emphasis on interdisciplinary collaboration and industry exposure equips students with the skills and knowledge to contribute meaningfully to the field of biomedical engineering. Riphah International University truly stands as a hub of excellence in biomedical engineering education.





Department of
Mathematics and Statistics

HoD's Message



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, BS (Weekend Admission to 5th Semester for B.Sc and ADP Degree Holders) and M.Phil. and PhD levels. Thus, every student who gets admission in BS or BS(Weekend Admission to 5th Semester for B.Sc and ADP Degree Holders) 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, Department of Mathematics & Statistics

FACULTY, DEPARTMENT OF MATHEMATICS & STATISTICS

Dr. Muhammad Asad Zaighum

Designation: Associate Professor & Head of Department
Qualification: Postdoctoral Investigator, Departamento De Matematicas, Pontificia Universidad Javeriana, Bogota, Colombia
Field of Interest: PhD Mathematics, Government College University Lahore, Pakistan
Functional Analysis, Harmonic Analysis, Mapping Properties of Integral Operators in Banach Function Spaces, Complex Interpolation
Contact: asad.zaighum@riphah.edu.pk
+92 (51) 8446000 Ext: 356

Dr. Muhammad Aslam

Designation: Professor
Qualification: PhD Statistics, University of Wales, UK
Field of Interest: Mathematical Statistics, Paired Comparison Models, Bayesian Inference
Contact: m.aslam@riphah.edu.pk
+92 (51) 8446000 Ext: 316

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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+92 (51) 8446000 Ext: 317

Dr. Abdullah Shoaib

Designation: Associate Professor
Qualification: PhD Mathematics, International Islamic University Islamabad, Pakistan
Field of Interest: Fixed Point Theory
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+92 (51) 8446000 Ext: 350

Dr. Naveed Yaqoob

Designation: Associate Professor
Qualification: PhD Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest: Fuzzy Algebraic Structures
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+92 (51) 8446000 Ext: 329

Dr. Ambreen Bano

Designation: Assistant Professor
Qualification: PhD Mathematics, Riphah International University, Islamabad, Pakistan.
Field of Interest: Fluid Mechanics
Contact: ambreen.bano@riphah.edu.pk
+92 (51) 8446000 Ext: 222

Dr. Hammad Nafis

Designation: Assistant Professor
Qualification: PhD Mathematics, Riphah International University, Islamabad, Pakistan.
Field of Interest: Functional Analysis, Harmonic Analysis,
Contact: hammad.nafees@riphah.edu.pk
+92 (51) 8446000-7 Ext: 350

Dr. Muhammad Ijaz Khan

Designation: Assistant Professor
Qualification: Ph.D. Mathematics, Quaid-i-Azam University Islamabad, Pakistan
Field of Interest : Fluid Mechanics
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Dr. Ambreen Shafqat

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Dr. Shahid Farooq

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Dr. Mudassir Shams

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Dr. Abbas Ali

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Ms. Sadia Nadir

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Ms. Shehzadi Salma Kanwal

Designation: Senior Lecturer
Qualification: M.Phil in Mathematics Quaid I Azam University, Islamabad, Pakistan
(PhD in progress) Riphah International University, Islamabad, Pakistan
Field of Interest: Algebra
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Ms. Shar Naseem

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Qualification: MPhil Mathematics, Riphah International University Islamabad
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+92 (51) 8446000 Ext: 288

Mr. Zeeshan Ashraf

Designation: Teaching Fellow
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Field of Interest: Statistics
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Tel: +92 (51) 8446000 Ext: 280

Faculty, Department of Mathematics & Statistics



L to R Sitting: Dr. Muhammad Yaqub Khan, Dr. Asad Zaighum (HoD, Maths & Statistics Dept.), Prof. Dr. Jameel Ahmed (DEAN, FEAS), Dr. Muhammad Aslam, Dr. Naveed Yaqoob.

L to R Standing: Mr. Farrukh Mehmoed, Mr. Zeeshan Ashraf, Mr. Zeeshan Ayub, Dr. Mudassir Shams, Dr Abbas Ali, Dr. Shahid Farooq, Dr. Ambreen Bano, Ms. Shar Naseem, Ms. Sadia Nadir, Ms. Shehzadi Salma Kanwal

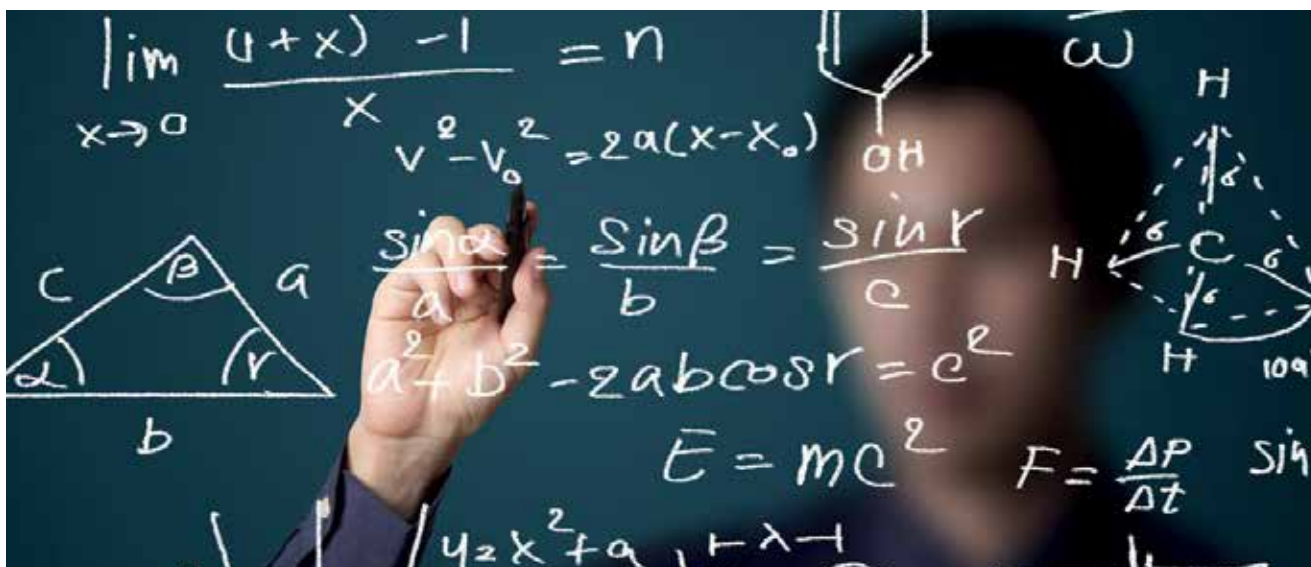
BS Mathematics

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.

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

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.

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-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-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

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

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-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-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

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 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 (Weekend)

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-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-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-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

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

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

Duration:

Minimum 2 years & Maximum 4 years

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
Sub-Total				12

Semester-3

Code	Title	LT	LB	CR
MAT 699	Dissertation	0	0	3
UR 711	Professional Ethics-I	0	0	2
Sub-Total				5

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)

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:

Selection Criteria:

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

Class Timings (Weekend):

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

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
Sub-Total				12

Semester-4

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

Total Credit Hours: 34

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	Professional Ethics-I	(2-0-2)

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 or 60% score in GAT subject mathematics conducted by NTS valid on the time of admission.
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
Sub-Total				9

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
Sub-Total				9

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)

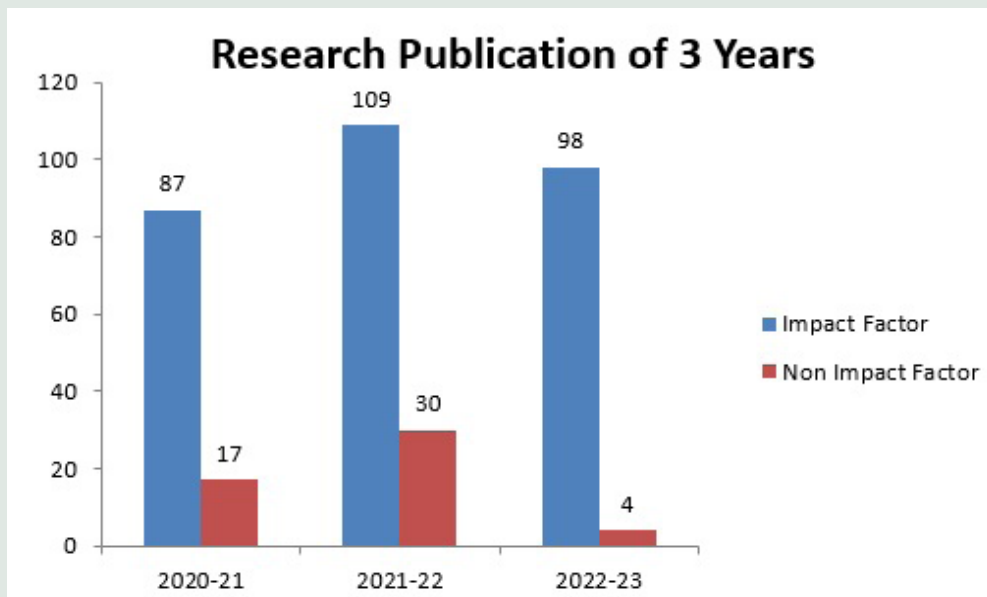
Code	Course Title	Cr. Hours
MAT 7008	LA-Semigroups	(3-0-3)
MAT 7009	Advanced Ring Theory-I	(3-0-3)
MAT 7010	Advanced Ring Theory-II	(3-0-3)
MAT 6006	Theory of Group Actions	(3-0-3)
MAT 6007	Theory of Group Graphs	(3-0-3)
MAT 7011	Rough set theory and its Applications	(3-0-3)
MAT 7012	Fuzzy Logic and 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	(0-0-30)



SUMMARY OF RESEARCH PUBLICATIONS (MATHEMATICS & STATISTICS DEPARTMENT)



Graduate & Undergraduate Alumni

Dr. Nasir Shah

PhD Mathematics-2019



About Riphah

Assalam-o-Alaikum, I'm Dr. Nasir Sh. I have done PhD in Mathematics from Riphah University. This organization is an identity that I carry in me, owing to the values this organization has ingrained in me. This university has an excellent human capital stock in the fact that excellent, yet humble faculty members are working here. There is diversity in terms of its students' composition; students hailing from various parts of the country study here which offers learning opportunities to grasp cultural diversity.

The doctoral degree at this university is research-intensive and the focus is on transferring professional academic acumen among the doctoral scholars. I have learned a lot from this university and I am looking forward to contribute to the academic community in the long-run.

Dr. Akhter Rasheed

PhD Mathematics-2019



About Riphah

Riphah International University stands out as an institution that fosters a truly encouraging and conducive environment for academic pursuits, particularly in the field of mathematics. As a recipient of a Ph.D. in mathematics from Riphah, I can confidently attest to the goodness of this university. The faculty members at Riphah are exceptionally knowledgeable and dedicated, providing expert guidance and mentorship to students. Their passion for the subject matter is infectious, and they go above and beyond to ensure that students are equipped with a strong foundation in mathematical concepts and methodologies. The university also emphasizes interdisciplinary collaboration, enabling students to explore various applications of mathematics in fields such as engineering, finance, and computer science. Moreover, the research facilities and resources at Riphah are state-of-the-art, allowing students to engage in cutting-edge research and contribute to the advancement of mathematical knowledge. The university also prioritizes a holistic approach to education, nurturing not only academic excellence but also the personal and professional growth of its students. The inclusive and diverse campus community at Riphah promotes a sense of belonging, fostering meaningful connections and friendships among students from different backgrounds.

Yasir Abbasi

MSc Mathematics-2021



About Riphah

My name is Yasir Abbasi, and I am proud to have completed my MSc in mathematics from Riphah International University Islamabad. This esteemed institution has provided me with an exceptional platform for personal and academic growth. The rigorous curriculum and dedicated faculty have expanded my knowledge and deepened my understanding of various mathematical concepts. The practical applications of mathematics taught at Riphah have equipped me with invaluable skills for real-world problem-solving. I am confident that my education from Riphah International University has prepared me for a successful future in academia and research.

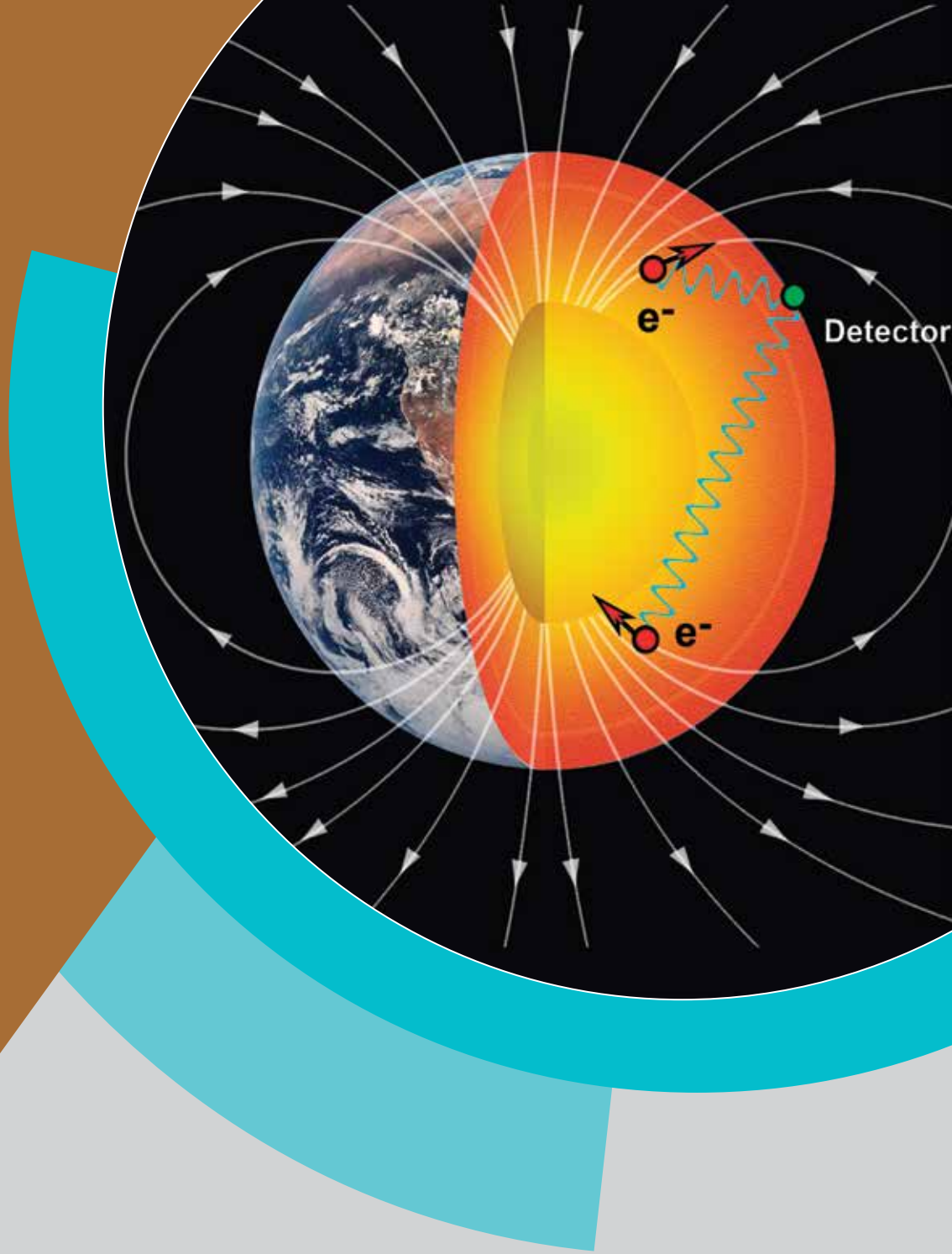
Muhammad Sadaqat

MSc Mathematics-2021



About Riphah

I am Muhammad Sadaqat and I am delighted to share that I have successfully completed my MSc degree from Riphah International University. I am immensely grateful for the outstanding education and support I received throughout my academic journey. The university's esteemed faculty deserves commendation for their unwavering dedication, expertise, and commitment to shaping students into well-rounded individuals. Their guidance and mentorship have been invaluable in my personal and professional growth. Riphah International University has truly exceeded my expectations, and I am proud to be an alumnus of such a prestigious institution.



Department of
Physics

HoD's Message



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, BS (Weekend Admission to 5th Semester for B.Sc and ADP Degree Holders), 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, Department of Physics

FACULTY, DEPARTMENT OF PHYSICS

Dr. M. Farooq Nasir

Designation: Associate Professor & Head of Department
Qualification: PhD Physics, COMSATS University Islamabad, Pakistan
Field of Interest: Nano Technology Condense Matter Physics
Contact: farooq.nasir@riphah.edu.pk
+92 (51) 8446000 Ext: 246

Dr. Amin Ur Rahman

Designation: Associate Professor
Qualification: PhD Physics, Hazara University, Mansehra
Field of Interest: Theoretical Atomic and Molecular Physics, Density Functional Theory (DFT), Ion Photon Interaction
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Dr. Nasir Mehboob

Designation: Assistant Professor
Qualification: PhD Physics, University of Vienna, Austria
Field of Interest: Solid State Physics, Magnetism and Magnetic Materials, Modeling and Simulations
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Dr. Irfan Qasim

Designation: Assistant Professor
Qualification: PhD Physics, International Islamic University Islamabad
Field of Interest: Nano Materials Applications, Photovoltaics Devices
Contact: irfan.qasim@riphah.edu.pk
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Dr. Muhammad Waqar Ahmed

Designation: Assistant Professor
Qualification: Ph.D Physics, Jeju National University, South Korea
Field of Interest: Plasma Physics
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Dr. Sikander Azam

Designation: Assistant Professor
Qualification: PhD Physics, University of West bohemia, Pilsen, Czech Republic
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Dr. Muhammad Tahir Khan

Designation: Assistant Professor
Qualification: PhD Materials Sciences & Engineering, Xian Jiaotong University, P. R China
Field of Interest: Material Sciences and Engineering
Contact: mtahir.khan@riphah.edu.pk
+92 (51) 8446000 Ext: 334

Dr. Azmat Iqbal

Designation: Assistant Professor
Qualification: PhD Physics, University of the Punjab (Centre for High Energy Physics)
Field of Interest: High energy physics, Atomic and Molecular Physics, Quantum Optics, Plasmonics, Condensed Matter Physics
Contact: azmat.iqbal@riphah.edu.pk
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Dr. Mahpara Ghazanfar

Designation: Senior Lecturer
Qualification: PhD Physics Riphah International University Islamabad
Field of Interest: Computational Materials Science
Contact: mahpara.ghazanfar@riphah.edu.pk
+92 (51) 8446000 Ext: 336

Mr. Asif Zaheer

Designation: Lecturer
Qualification: PhD Physics, Islamic International University, Islamabad
Field of Interest: High energy particle and Nuclear Physics.
Contact: asif.zahir@riphah.edu.pk
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Mr. Qazi Ahkam

Designation: Lecturer
Qualification: MPhil Physics, University of Peshawar,
(PhD In Progress) Riphah International University Islamabad
Field of Interest: Semi-Conductor Physics
Contact: qaziahkam@hotmail.com
+92 (51) 8446000 Ext: 296

Ms. Hafiza Tahira Mahmood

Designation: lecturer
Qualifications: Mphil Physics, University of the Punjab Lahore
PhD (In progress) Notional University of Sciences and Technology (NUST)
Field of Interest: Fabrication of metal oxide thin films for PSCs.
Email: tahira.mahmood@riphah.edu.pk

Ms. Shagufta Rasool

Designation: Teaching Fellow
Qualification: MSc Physics, Riphah International University Islamabad
Field of Interest: Material Sciences
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Faculty, Department of Physics



L to R Sitting: Dr. Nasir Mehboob, Dr. M. Farooq Nasir(HoD, Physics Dept.), Prof. Dr. Jameel Ahmed (DEAN, FEAS), Dr. Amin ur Rehman,
Dr. Irfan Qasim

L to R Standing: Mr. Asif Zaheer, Mr. Qazi M. Ahkam, Dr. Sikandar Azam, Dr. Muhammad Waqar Ahmed, Dr. Mahpara Ghazanfar,
Ms. Hafiza Tahira, Ms. Shagufta Rasool

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, BS (Weekend Admission to 5th Semester for B.Sc and ADP Degree Holders), 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	105
General courses	8	20
Elective Courses/ Projects	4	12
Total	49	137

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-I

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
UR-220	Pakistan Studies	(3,0)3
PHY(L) 1002	Lab II- Electricity and Magnetism	(0,1)1
	Total Credits	(16,1)17

Semester-IV

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
UR-330	Introduction to Basic Teachings of Qur'an	(2,0)2
	Total Credits	(17,1)18

Semester-V

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
UR-324	Introduction to Hadith and Sirah	(2,0)2
	Total Credits	(14,2)16

Semester-VII

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
PHY xxxx	Elective/Project	(3,0)3
	Total Credits	(15,2)17

Semester-II

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
UR-220	Pakistan Studies	(3,0)3
PHY(L) 1002	Lab II- Electricity and Magnetism	(0,1)1
	Total Credits	(16,1)17

Semester-III

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-VI

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
UR-550	Professional Ethics	(2,0)2
	Total Credits	(14,2)16

Semester-VIII

Course Code	Course Title	Cr. Hours
PHY 4104	Statistical Physics	(3,0)3
PHY 4105	Solid State Physics-II	(3,0)3
UR-460	Family Life in 21 st Century: Challenges and Prospects	(2,0)2
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective/Project	(3,0)3
	Total Credits	(17,0)17

Total Credit Hours: 137

Elective Courses for BS Physics Program

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

Laboratory Courses in 4 Years BS Physics Program

Students will take seven laboratory courses, Lab-I through Lab VII. 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	• Mechanics
PHY(L) 1002	Lab-II	2	1	• Electricity and Magnetism
PHY(L) 2001	Lab-III	3	1	• Waves & Oscillation
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
PHY(L) 4001	Lab-VII	7	2	• Spectroscopy

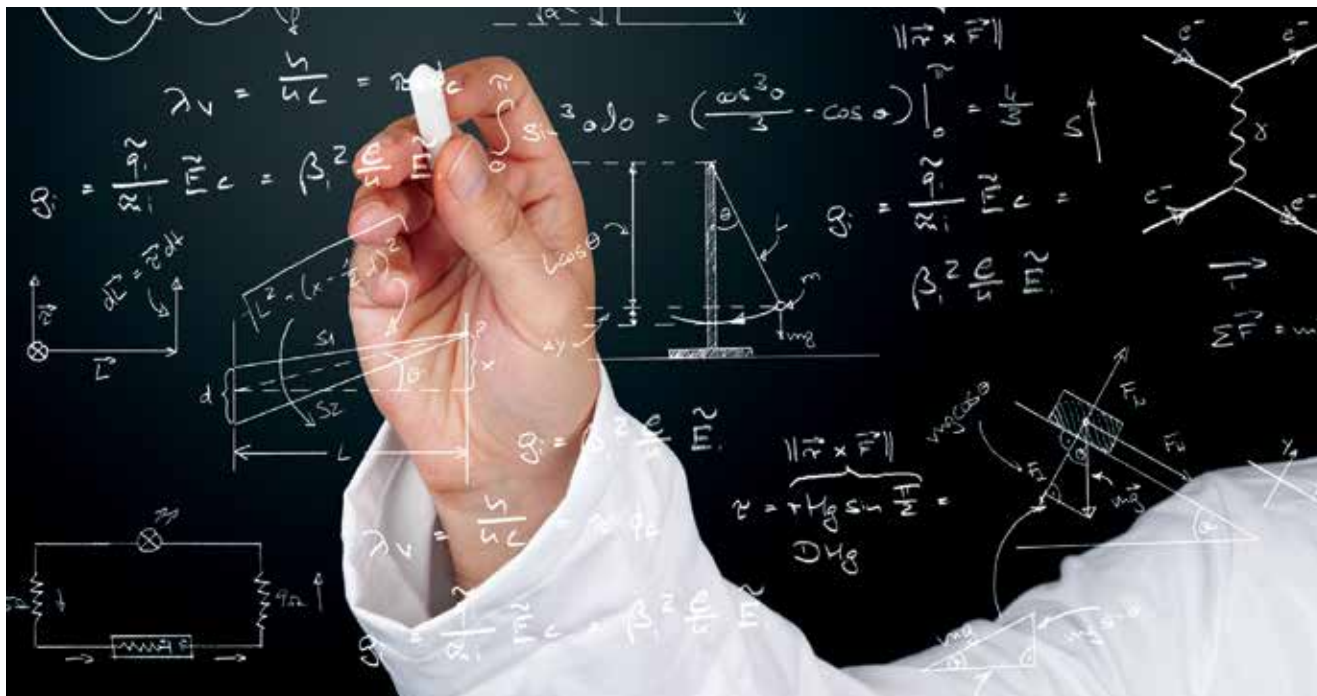


BS Physics (Weekend)

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-I

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
UR-324	Introduction to Hadith & Sirah	(2,0)2
	Total Credits	(14,2)16

Semester-II

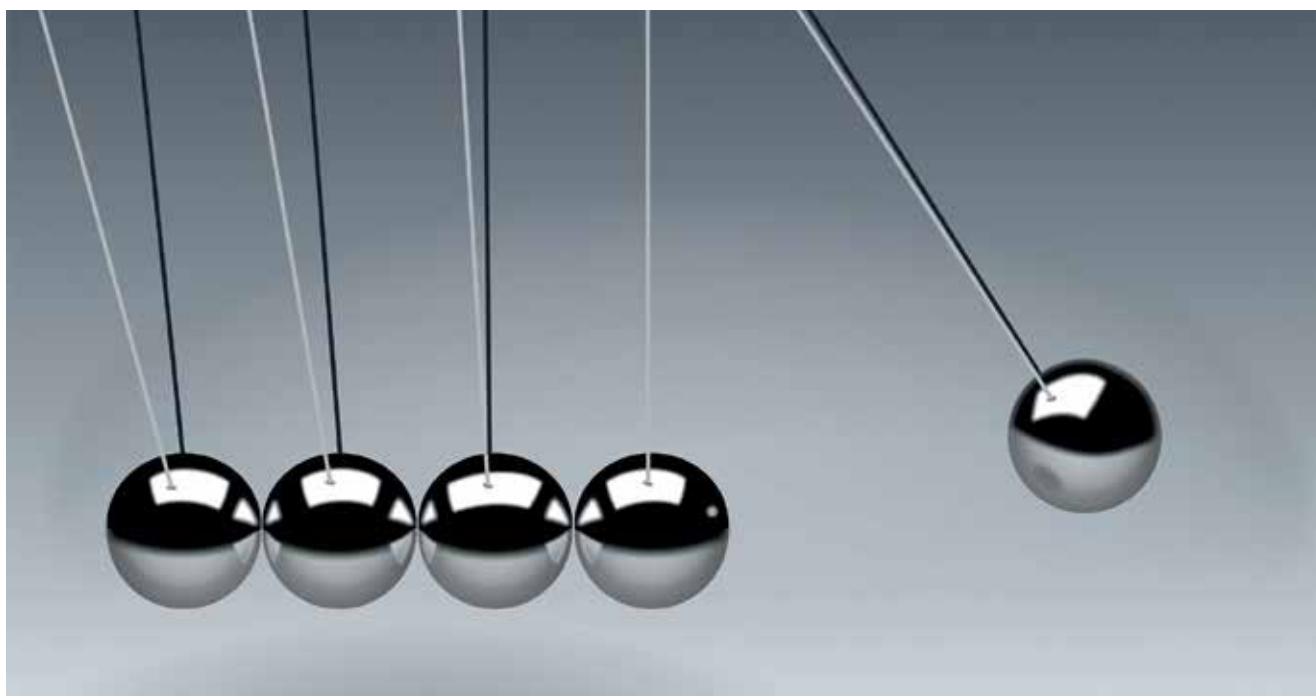
Course Code	Course Title	Cr. Hours
PHY 3104	Mathematical Methods of Physics-II	(3,0)3
PHY 3105	Quantum Mechanics-I	(3,0)3
PHY 3106	Electronics-II	(3,0)3
PHY 3107	Electromagnetic Theory-II	(3,0)3
PHY(L) 3002	Lab-VI Modern Physics	(0,2)2
UR-550	Professional Ethics	(2,0)2
	Total Credits	(14,2)16

Semester-III

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
PHY xxxx	Elective/Project	(3,0)3
	Total Credits	(15,2)17

Semester-IV

Course Code	Course Title	Cr. Hours
PHY 4104	Statistical Physics	(3,0)3
PHY 4105	Solid State Physics-II	(3,0)3
UR-460	Family Life in 21 st Century: Challenges & Prospects	(2,0)2
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective	(3,0)3
PHY xxxx	Elective/Project	(3,0)3
	Total Credits	(17,0)17



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 pursuing 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	18	30	48

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

Minimum 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.

- M.Phil/M.S./B.S. Mathematics degree or equivalent degree holders can apply for PhD (Mathematics) admission. • CGPA 3/4.00
- 70% score in Ph.D. admission test conducted by the department or GRE passed conducted by ETS or 60% score in GAT subject Physics conducted by NTS valid on the time of admission.
- 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.
- 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
	Compulsory Courses	
PHY 6001	Advanced Mathematical Methods for Physics	3
PHY 6002	Advanced Electrodynamics	3
PHY6003	Advanced Quantum Mechanics	3
PHY6004	Advanced Statistical Physics	3
UR 711	Professional Ethics-I	2
	Elective Courses	
PHY 6011	Magnetism and Magnetic Materials	PHY 6011
PHY 6012	Nano Materials	PHY 6012
PHY 6013	Advanced Solid State Electronic Devices	PHY 6013
PHY 6014	Advanced Plasma Physics	PHY 6014
PHY 6015	Particle Physics Phenomenology	PHY 6015
PHY 6016	Materials Science	PHY 6016
PHY 6017	Materials Characterization Techniques	PHY 6017
PHY 6018	Physics of Superconductors	PHY 6018
PHY 6019	Surface Physics	PHY 6019
PHY 6020	Experimental Techniques in Physics	PHY 6020
PHY 6021	Lasers and Optics	PHY 6021
PHY 6022	Nanotechnology and Nanomaterials	PHY 6022
PHY 6023	Vacuum Science & Technology	PHY 6023
PHY 6024	Environmental Radiation Protection	PHY 6024
PHY 6025	Physics of Thin Films	PHY 6025
PHY 6026	Accelerator Physics	PHY 6026
PHY 6027	Particle Detectors	PHY 6027
PHY 6028	Environmental Physics	PHY 6028
PHY 6029	Medical Physics	PHY 6029
PHY 6030	Advanced Functional Materials	PHY 6030
PHY 6031	Semiconductor Physics	PHY 6031
PHY 6032	Condensed Matter Theory-I	PHY 6032

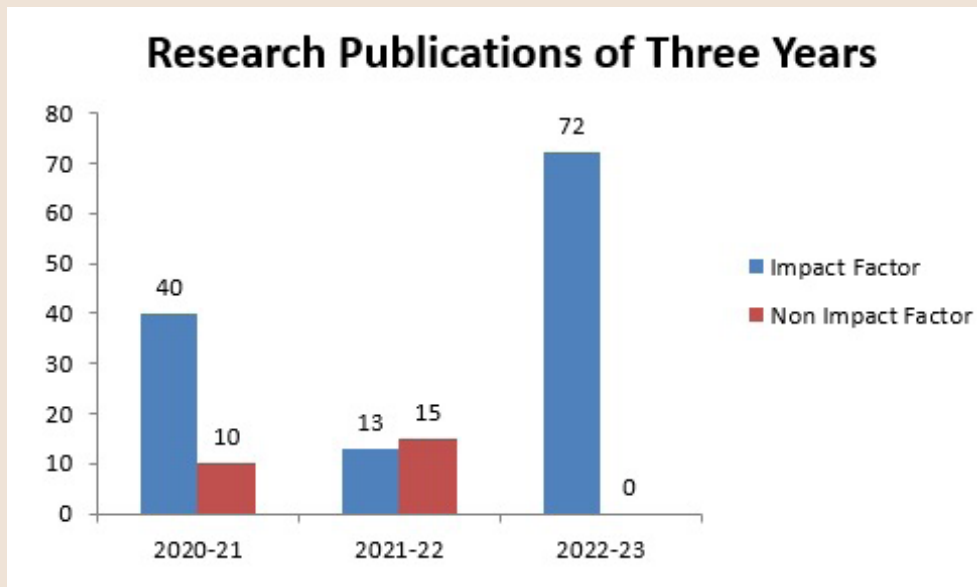
Code	Course Title	Cr. Hours
PHY 6033	Condensed Matter Theory-II	PHY 6033
PHY 6034	Optical Properties of Solids	PHY 6034
PHY 6035	Magnetism in Condensed Matter	PHY 6035
PHY 6036	Density Functional Theory	PHY 6036
PHY 6037	Nano-magnetism	PHY 6037
PHY 7001	High Energy Physics	PHY 7001
PHY 7002	Quantum Optics	PHY 7002
PHY 7003	Heavy Ion Physics	PHY 7003
PHY 7004	Advanced Computational Physics	PHY 7004
PHY 7005	Industrial Plasma Physics	PHY 7005
PHY 7006	Standard Model	3
PHY 7007	Neutrino Physics	3
PHY 7008	Principle, method and applications of nuclear tracks	3
PHY 7009	Cosmology	3
PHY 7010	Advanced Topics in Super conductivity	3
PHY 7011	Quantum Field Theory	3
PHY 7012	Parallel Programming Model	3
PHY 7013	Advanced Biomedical Image Processing	3
PHY 7014	Advanced Topics in Materials Science	3
	Research Work	
PHY 6099	MPhil Research Dissertation	6
PHY 7099	Ph.D. Research Thesis	30

Research Laboratories for M.Phil. and PhD Scholars

1. Material Science Lab
2. Plasma Technology Lab
3. Computational Physics Lab
4. Solar Cell Simulation Research Lab
5. Nano Technology Lab

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

SUMMARY OF RESEARCH PUBLICATIONS (PHYSICS DEPARTMENT)



Graduate & Undergraduate Alumni

Dr. Abid Zaman

PhD Physics-2023

About Riphah

Assalam-o-Alaikum, I'm Dr. Abid Zaman. I have done PhD in Physics from Riphah University this year. I am delighted to share my thoughts and experiences regarding Riphah Int'l University. I am pleased to say that this is one of the institutes which have given me an environment of academic growth, personal transformation and career encroachment. The most remarkable aspect which I really appreciated is its commitment to academic excellence. The faculty members are thoroughly equipped with knowledge in their respective fields and are honest in imparting this knowledge to their students. During my degree, I had published more than 60 research articles from this university which shows its credibility. The university's commitment to providing a supportive research environment has prepared me for the challenges of the scientific community. Succinctly, I would recommend Riphah University to prospective students who are seeking quality education in a cherishing and intellectually stimulating environment. My time at Riphah University has been transformative, and I am confident that this institution will empower you to achieve your academic and career aspirations.



Dr. Nadia Kausar

PhD Physics-2023

About Riphah

My name is Nadia Kausar. I have completed my PhD in Physics from Riphah International University, Islamabad. My experience at this prestigious university has been great. The esteemed faculty members possess high intellect and have been really helpful during my studies. Teachers kept me motivated during the tiresome PhD journey. Labs were well-equipped. The Department was cooperative and efficient. The University not only helped me refine my career goals but also helped polish my social skills. Presentations and sessionals were conducted timely and I was able to balance both my studies and professional commitments efficiently. Faculty members encouraged the involvement of female students in every avenue and created an environment of gender equality. The overall experience has been fruitful.



Ms. Ayesha Arif

MSc Physics-2023

About Riphah

This is Ayesha Arif and I completed my MSc Physics from Riphah International University, Islamabad. It had been a wonderful experience and it brought many changes in my personality. The university's esteemed faculty deserves commendation for their unwavering dedication, expertise, and commitment to shaping students into well-rounded individuals. Their guidance and mentorship have been invaluable in my personal and professional growth. I am confident that my education from Riphah International University has prepared me for a successful future in academia and research.



Syed Asim Shahzad

MSc Physics-2023

About Riphah

My name is Syed Asim Shahzad and I have done M.Sc Physics from Riphah International University, Islamabad. It is a renowned institution known for its academic excellence and commitment for providing quality education. As an M.Sc Physics student at Riphah, I can confidently say that my experience at the university has been highly rewarding. One of the notable aspects of Riphah International University is its dedicated faculty. The professors in the Physics department are not only highly qualified but also possess a deep passion for their subject. They go above and beyond to ensure that students grasp complex concepts, encouraging interactive learning through practical demonstrations and engaging discussions. The faculty members are approachable, supportive, and always willing to provide guidance and assistance. Overall, my experience as an M.Sc Physics student at Riphah International University has been exceptional. The university's commitment to academic excellence, dedicated faculty, emphasis on research, and focus on holistic development have truly shaped my educational journey and prepared me for a successful future in the field of physics.



ISLAMABAD / RAWALPINDI

Al-Mizan Campus:

Al-Mizan IIMCT Complex,
274-Peshawar Road, Rawalpindi.
UAN: +92 (51) 111-510-510
Phone: +92 (51) 512 5162-7

I-14 Campus:

Sector I-14, Haji Camp, Islamabad.
Phone: +92 (51) 844 6000-7
UAN: +92 (51) -111-747-424

G-7 Campus:

RIU, 7th Avenue, G-7/4, Islamabad.
Phone: +92 (51) 289 1835-8
Fax: +92 (51) 289 0690

Gulberg Green Campus:

Plot No PB-02 Gulberg Expressway,
Gulberg Green (IBECHS), Islamabad
Phone: +92 (51) 5912890-5

ETB Campus:

Suite No 7, Ground Floor, Evacuee
Trust Complex, Agha Khan Road,
Sector F-5/1, Islamabad.
Phone: +92 (51) 843 8370-7

Westridge Campus:

Potohar Plaza, main Peshawar Road,
Rawalpindi.
Phone: +92 (51) 5166 813-4, 5166 917-8

IIMCT Pakistan Railway Hospital:

Westridge, Rawalpindi.
Phone: +92 (51) 425 9795-8
Fax: +92 (51) 425 9793

Riphah International Hospital:

Main Expressway opposite DHA II,
Sihala, Islamabad.
Phone: +92 (51) 448 6064

Islamic International Dental Hospital:

IIDH, 7th Avenue, G-7/4, Islamabad.
Phone: +92 (51) 289 1835-8
Fax: +92 (51) 289 0690

MaxHealth Hospital:

2-K Markaz Road, G-8 Markaz,
Islamabad
Phone: +92 (51) 8094760-65

LAHORE

Raiwind Campus:

Raiwind Road Campus,
13-Km, Raiwind Road, Lahore.
Phone: +92 (42) 111- 747-424

Quaid-e-Azam Campus

28-M, Quaid-e-Azam, Industrial
Estate, Kot Lakhpat, Lahore.
UAN: +92 (42) -111-747-424

Gulberg Campus:

26-M, Gulberg - III,
Ferozepur Road, Lahore
UAN: +92 (42) -111-747-424

FAISALABAD

Faisalabad Campus:

Satiana Road, Adjacent Fish Farm,
Faisalabad.
Phone: +92 (41) 8777- 210 & 310

MALAKAND

Malakand Campus:

Chakdara Road, Malakand.
Phone: 0314-3019495



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