

**PHYSICS**  
MS AND PhD PROGRAMMES  
FALL 2020

**RESEARCH  
INNOVATE  
IMPACT**

# CREATING A BETTER WORLD

WITH LUMS SBASSE

For over a decade, the Syed Babar Ali School of Science and Engineering (SBASSE) at LUMS has been imparting top-quality education with an aim to carry out world-class, multidisciplinary research.

SBASSE offers undergraduate, graduate and doctoral degrees in a wide range of disciplines. The MS programmes at SBASSE are rigorous and designed to impart specialised professional and research-oriented training to students. To graduate, students must accumulate a total of 30 credit hours either entirely from coursework, or by collecting 24 credit hours from coursework and the rest from a thesis. Hence, all SBASSE departments offer two options to choose from: MS-by-Coursework or MS-by-Thesis.

The SBASSE PhD programmes prepare students to think scientifically and conduct high-quality research independently. To graduate, students must earn a total of 42 credit hours from which 18 must be from coursework and 24 from research work/thesis. Major milestones that must be achieved for the successful completion of the PhD degree include the Comprehensive (Qualifying) Examination, Thesis Proposal Defense and PhD Thesis Defense.

During the course of study, student learning takes place through lectures, tutorials, laboratories, problem-solving exercises, research projects and frequent interaction with experienced, world-class faculty members.

6

DISCIPLINES:

**BIOLOGY**  
**CHEMISTRY**  
**COMPUTER SCIENCE**  
**ELECTRICAL ENGINEERING**  
**MATHEMATICS**  
**PHYSICS**

**SBASSE OFFERS**  
**UNDERGRADUATE,**  
**GRADUATE &**  
**DOCTORAL**  
**DEGREES**

# WHY CHOOSE SBASSE



## MULTIDISCIPLINARY EDUCATION

The rigorous curriculum of the graduate programmes at SBASSE offers a multidisciplinary learning environment. It provides students with the opportunity to work with knowledge drawn from all six disciplines being offered at SBASSE as a part of the free elective requirement.



## TOP-QUALITY PUBLICATIONS

The research conducted by graduate students has been published in top-quality, renowned journals including:

- Journal of Mathematical Analysis and Applications
- IEEE/ACM Transactions on Networking
- Artificial Intelligence Review
- Photonics and Nanostructures: Fundamentals and Applications
- Organic Letters
- The Journal of Biological Macromolecules
- Nature Publishing Group
- Royal Society of Chemistry
- Journal of Computational and Applied Mathematics



## INTERNATIONAL AND NATIONAL EXCHANGE PROGRAMMES

MS and PhD students at SBASSE participate in various exchange programmes and research opportunities sponsored by National ICT R&D Fund, HEC, Commonwealth, Erasmus-Mundus, DAAD etc.



## OUR PLACEMENTS

Top academic placements (Massachusetts Institute of Technology, University of Warwick, London School of Economics, University of Oxford, University of Cambridge etc.)

Our graduates are hired by top local and international organisations (Engro Corporation, Nestle Pakistan, Systems Ltd., Microsoft, Google, Facebook etc.)

64% of the graduates have been placed on jobs and 49% who opted for higher studies received scholarships from different universities across the globe.

MS and PhD students work alongside faculty members at SBASSE as Teaching Assistants and Research Assistants.

## COLLABORATIONS WITH NATIONAL AND INTERNATIONAL INSTITUTES

- Institute of Electronics and Telecommunications of Rennes, France
- Singapore University of Technology and Design, Singapore
- CentraleSupélec, France
- Texas A&M University, Qatar
- NUST School of Electrical Engineering and Computer Science, Pakistan

# MS | PhD PHYSICS

## QUICK FACTS

**64%**  
graduates placed  
on jobs

**80+**  
highly qualified  
faculty members

## HOW WILL YOU LAUNCH YOUR NEW WORLD?

The Department of Physics focuses on probing fundamental physical aspects of the universe and the underlying mathematics, as well as novel applications in diverse areas including Nanoscience, Optics, Nanophotonics, Quantum Dynamics, Spin and Photon Physics, Fundamental Theory, Photonics, Organic Semiconductor Optoelectronics, Cosmology and Magnetic Materials.

An important character of the Department of Physics is embodied in encouraging students to get involved in research questions and exploratory experiments outside the formal classroom or laboratory coursework. Regular seminars and colloquia are led by the faculty, students and distinguished speakers from outside LUMS and provide a chance to keep abreast of cutting edge and high impact research.

## WHAT WILL YOUR NEW WORLD INVENT?

The Physics faculty is actively engaged in cutting edge research in the areas of Basic and Applied Physics. Both theoretical and experimental research is being conducted in the Department with active involvement of graduate students. Faculty members and their research areas are listed below:

### SPIN AND PHOTON PHYSICS

Dr. Muhammad Sabieh Anwar

### QUANTUM DYNAMICS

Dr. Adam Zaman Chaudhry

### PLASMONICS AND NANOENGINEERED MATERIALS

Dr. Muhammad Faryad

### COSMOLOGY

Dr. Maqbool Ahmed

### SOLAR CELLS AND OPTOELECTRONICS

Dr. Ammar Ahmed Khan

### QUANTUM OPTICS

Dr. Ata Ulhaq

### SCALAR INTERACTIONS

Dr. Tajdar Mufti, Dr. Syed Moez Hassan

### MAGNETIC THIN FILMS AND ARTIFICIAL STRUCTURES

Dr. Karmen Bohos Tzalikian



## DR. SHAHID MASUD

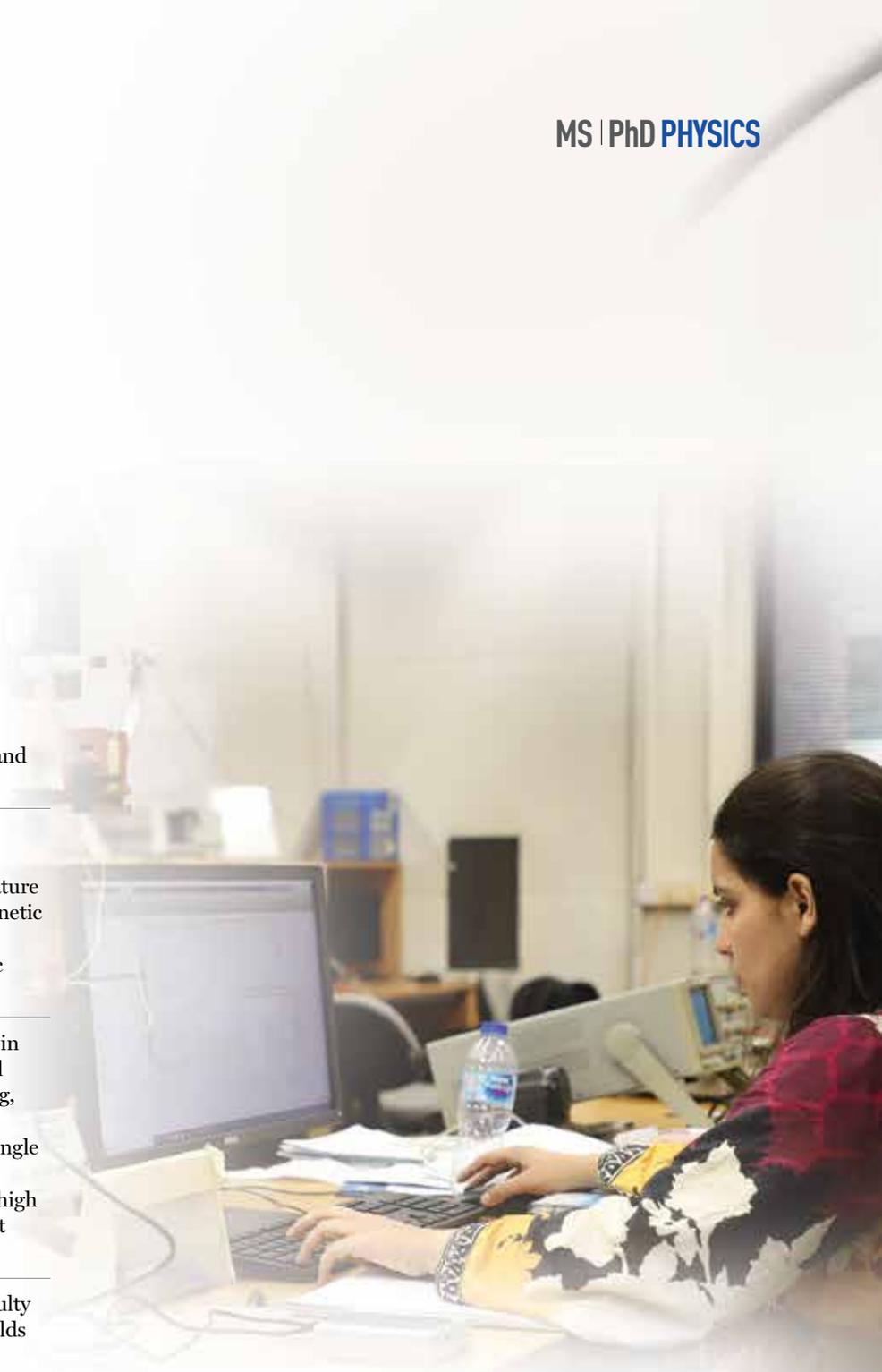
Dean and Professor, Syed Babar Ali School of Science and Engineering

“Our multifaceted 21st century curriculum provides students adequate breadth and depth in their education, and positions them to pursue rapidly evolving areas that interface with other disciplines. The fact that our graduates are much sought after by leading academic institutions as well as organisations in the Engineering and IT sectors every year serves as a solid indicator of the high-quality of our programmes. With our resolute vision, excellent research-active faculty, outstanding students and modern infrastructure that includes state-of-the-art classrooms and laboratories, SBASSE is poised to become a globally competitive leader in Science and Engineering research and education.”

## HOW WILL SBASSE HELP YOU REALISE YOUR AMBITION?

The Department of Physics houses

- laboratories in Solid State Physics, Nanoscience, Optics and Photonics, Radiation Physics and Measurement and Instrumentation
- home-grown facilities in diverse areas of physics including synthesis of new materials, cryogenic and high temperature transport, electrical, thermal and magnetic properties measurements, homebuilt atomic force microscopy and magnetic resonance devices
- a wide range of experimental facilities in optics like optical spectroscopy, optical and Kerr microscopy, sensitive imaging, light modulation, radiation detection, X-ray fluorescence, quantum optics, single photon detection, electrodeposition, electro spinning, sputter coating, and high speed electronic test and measurement equipment
- research groups headed by various faculty members aiming to explore various fields of Physics



### DR. MUHAMMAD FARYAD

Assistant Professor and Chair, Department of Physics

“The Physics Department at SBASSE has an outstanding teaching and research environment where our students can relish this relentless quest for an appreciation of our material surroundings and assist in our goal of enhancing the country’s and region’s intellectual, economic and material capital.

In the Physics Department, the thrust is interdisciplinary, the focus is on strong mathematical and physical basics as well as a keen appreciation of applications. Through a rigorous curriculum taught by an exciting group of people, hailing from diverse training in particle physics, quantum gravity, spintronics, optics, and condensed matter physics, and supported by modern, state-of-the-art experimental facilities, we enrich our students’ learning experience.”

## EMBRACE THE SBASSE EXPERIENCE

- Dr. Ihsan Ayyub Qazi, Associate Professor of Computer Science at SBASSE and Dr. Ayesha Ali, Assistant Professor of Economics at Mushtaq Ahmad Gurmani School of Humanities and Social Sciences, won the highly competitive Facebook Integrity Foundational Research Award worth USD 50,000 for their proposal, 'Understanding the Impact of Digital Literacy on Misinformation in Pakistan.'
- The International Commission for Optics and the Abdus Salam International Centre for Theoretical Physics declared Dr. Muhammad Faryad, Assistant Professor, Department of Physics, as winner of the 2019 Gallieno Denardo Award, for his contributions to Optics research and education.
- Dr. Shaper Mirza, Associate Professor of Biology won The Shahid Hussain Foundation's Public Health Research Grant 2018 worth PKR 1 million.
- Two PhD Chemistry students—Iqra Azeem and Asma Gilane were awarded the Commonwealth Split-site PhD scholarships to spend a year at UK universities.
- Junaid Saif Khan, MS Physics 2018 was selected for the 69th Lindau Nobel Laureate Meeting in Lindau, Germany.
- LUMS Energy Institute carried out the power demand and supply analysis for Pakistan for the years 2018-2030.
- Tariq Lab at LUMS has discovered over 200 new genes that are involved in the maintenance of cell identities. These results will have a direct implication in the field of cancer biology and regenerative medicine.
- The LUMS Biomechanics Lab, a centre to test bowling actions, has now been accredited by the International Cricket Council, making it the fifth in the world to earn this accolade.



**MUHAMMAD SHIRAZ AHMAD**  
MS Physics 2019

“The Physics Department is run by a highly competent faculty, where each member is the best in his field of work. I can proudly say multiple students got admission to the world’s top universities after graduating from here. I would highly recommend applying to LUMS because it is so diverse; it not only shapes your future but also allows you to learn about yourself.”

## YOUR JOURNEY BEGINS HERE!

### ADMISSION PROCESS FOR LOCAL AND INTERNATIONAL STUDENTS

Admission is purely merit-based and rests solely on the following criteria:

- Academic record
- Admission test performance
- Submission of completed application form and supporting documents by the stipulated deadline
- Interview performance (if called)

For details, visit:

<https://admission.lums.edu.pk/graduate-programmes>

### TESTING DETAILS

#### Local Applicants

Applicants to the MS/PhD Programme in Physics are required to take the following two

(2) admission tests in order to be considered for Fall 2020 admission:

1. LUMS Graduate Admission Test (LGAT); and
2. LUMS SBASSE Subject Test in Physics

Exemption for applicants who have taken the Graduate Record Examination (GRE) Tests:

- Applicants who have taken the Graduate Record Examination (GRE) General Test (through the Educational Testing Service (ETS), USA) during last two (2) years (i.e. after April 01, 2018) and obtained an aggregate score of 300 in the Quantitative and Verbal sections may choose not to take the LGAT.
- Applicants who have taken the GRE Subject Test in Physics (through the

Educational Testing Service (ETS), USA) during last two years (i.e. after April 01, 2018) and obtained a score at the 60th percentile or above may choose not to take the SBASSE Subject Test in Physics.

#### International Applicants

Applicants residing outside Pakistan are required to take the following two (2) admission tests in order to be considered for Fall 2020 admission:

1. GRE - General Test; and
2. GRE - Subject Test in Physics

For GRE registration, please visit [www.ets.org](http://www.ets.org)

#### NOTE

- LUMS Graduate Admission Test (LGAT) is comprised of Quantitative, Verbal, and Analytical sections.
- The LUMS Graduate Admission Test (LGAT) and the SBASSE Subject Test in Physics for Fall 2020 admission will be held ONLY ONCE on April 12, 2020.
- LGAT and SBASSE Subject Test Scores will be valid only for one (1) academic year.
- The LGAT and SBASSE Subject Test scores will be used for application evaluation, hence will not be disclosed to applicants.

### FINANCIAL SUPPORT FOR LOCAL AND INTERNATIONAL STUDENTS

Admission to all LUMS programmes is purely on merit and independent of students' ability to pay the related tuition fees. Once a student has been admitted to a programme, there are several mechanisms in place to provide financial support based on need and merit. All awards are reassessed each academic year based on performance, need, available resources and prevailing University policies. LUMS is committed to providing as much financial assistance as possible within the limits of its available resources. Nevertheless, the University may not be able to meet all

requests for financial assistance, and it is strongly recommended that applicants secure as much of their own funding as possible. Several funding opportunities are available to deserving MS and PhD students. These include:

- Merit Scholarships for MS programmes
- Partial tuition fee waivers for all MS Basic Sciences and Mathematics students
- LUMS Interest Free Loan (only for local applicants)

- External Scholarships (support and eligibility for these scholarships vary depending on the donor)
- 100% Scholarships (tuition, registration, admission, and a stipend) for PhD students for 4 years
- HEC Research Grants
- Options to work as Research or Teaching Assistants (subject to availability)

For details, please visit: <https://financial-aid.lums.edu.pk/ms-programme-grad-fa>

### INTERNATIONAL STUDENTS

In order to study at LUMS, foreign nationals must obtain a 'Study Visa' from the Pakistani Embassy/Consulate working in their country. The Pakistani Embassy/Consulate will only issue a Study Visa for students' stay at LUMS upon receipt of Higher Education Commission (HEC), Pakistan's 'No Objection Certificate' and clearance from the Ministry of Interior, Pakistan.

For the issuance of Visa, students must submit relevant documents to the LUMS Admissions Office through postal mail/courier service by the stipulated deadline.

For details, please visit: [international.lums.edu.pk](http://international.lums.edu.pk)

# DATES TO REMEMBER

DEADLINE TO APPLY

**APRIL 1, 2020**

5:00 pm (PKT)

LGAT & SBASSE SUBJECT TEST

**APRIL 12, 2020**

DEADLINE TO APPLY FOR LUMS

UG CONTINUING STUDENTS

**APRIL 1, 2020 5:00 pm (PKT)**

DEADLINE TO TAKE GRE (GENERAL)

**APRIL 12, 2020**

ADMISSION DECISIONS

**JUNE - JULY 2020**

COMMENCEMENT OF CLASSES

**SEPTEMBER 2020**



**LUMS**

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