



LUMS

A Not-for-Profit University

Learning Without Borders



**IMAGINE
YOUR
FUTURE**

**MS & PhD
MATHEMATICS**
Fall 2022

Syed Babar Ali School of Science and Engineering

CREATING IMPACT THROUGH RESEARCH

The Syed Babar Ali School of Science and Engineering (SBASSE) at LUMS is taking strides in improving teaching and learning, while celebrating the novelty of research. SBASSE, through innovative and impactful contributions to science and technology, is nurturing future leaders with the potential to impact society.

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 completing 24 credit hours from coursework and 6 from research work/thesis. Thus 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. Major milestones that must be achieved for the successful completion of the PhD degree include the Coursework, Comprehensive (Qualifying) Examination, Thesis Proposal Defense, at least one peer-reviewed journal article 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

WHY CHOOSE SBASSE

QS World University

Rankings by Subject

#251 Computer Science and Information Systems

#351 Engineering – Electrical and Electronics

#382 Engineering and Technology

#501 Physics and Astronomy

KEY INITIATIVES

THE ONLY 600 MHZ NMR SPECTROMETER IN THE REGION

SBASSE's 600 MHz nuclear magnetic resonance (NMR) spectrometer can be accessed for molecular analysis. Researchers can send their samples and obtain high resolution spectra, both in one and two dimensions.

WEB PORTAL TO ACCESS ONLINE COURSES

The School's website hosts a portal that provides access to diverse online courses produced by its faculty. The offered courses range from introductory to advanced levels.

MATLAB ACCESS FOR EVERYONE

A MATLAB license for everyone working at the School including faculty, staff, researchers and students provides complete access to all of its toolboxes.

HIGH VOLTAGE ENGINEERING LABORATORY

This lab has been established to become a nursery for important work in the field of high voltage and power systems.

CLOUD CLASSROOMS

SBASSE is combining virtual classrooms with real learning by introducing a blended learning solution. Roving cameras, instructor-controlled zoom,

full wall projection of participants for maximum immersiveness, ability to record and display multiple views are some of the technical capabilities.

CENTRAL LAB

The Lab aims at becoming the go-to place for high-end characterisation and analysis for academia and industry within the country. Student apprenticeships, restructuring of the Central Lab committee, efforts to add new equipment and a brochure to disseminate information about the Lab, all speak to this.

PLACEMENTS

SBASSE has top academic placements (Massachusetts Institute of Technology, Harvard University, University of Warwick, London School of Economics, University of Oxford, University of Cambridge etc.). Its graduates are hired by top local and international organisations (Engro Corporation, Nestle Pakistan, Systems Ltd., Microsoft, Google, Facebook etc.)

LEARNING WITHOUT BORDERS

Research and teaching at LUMS truly offer its community 'Learning Without Borders' by breaking academic, geographic and socio-economic barriers to make education accessible to all. The University continues to be an intellectual hub, rich with varying perspectives and transformative ideas. With an environment brimming with inclusion, unity, and boundless knowledge, learning continues in and beyond the campus walls with the aim to develop innovators, leaders and change-makers who can contribute to the community and build strong borderless networks.

TOP QUALITY PUBLICATIONS

SBASSE faculty have produced around 300 articles, all published in international venues of prestigious ranking.

RECOGNITION OF TOP RESEARCH THROUGH SYED BABAR ALI RESEARCH AWARDS (SBARA)

These Awards recognise PhD students. The winners, called the Syed Babar Ali Fellows, are selected for the novelty of their research work, and the potential for lasting impact to their disciplines and the society.



MS | PhD MATHEMATICS

How will you launch your new world?

The Department of Mathematics comprises faculty members, students and research fellows studying and working across all fields within mathematics; ranging from Algebraic Topology to the Mechanics of Environment Systems. The Department is dedicated to conducting research in Pure as well as Applied Mathematics. Students have the opportunity to choose from many options, tailoring the programme to individual interests and requirements.

What will your new world invent?

Faculty at the Department of Mathematics is involved in research across a broad spectrum, from Analysis and Algebra To High Performance Computation and Mathematical Biology. Their research areas are as follows:

EVOLUTION EQUATIONS

Dr. Imran Naeem
Dr. Muhammad Ahsan

COMPUTATIONAL AND MATHEMATICAL BIOLOGY

Dr. Adnan Khan
Dr. Ashher Zaidi

SPECTRAL THEORY

Dr. Muhammad Usman

SCIENTIFIC COMPUTATION

Dr. Sultan Sial
Dr. Amer Rasheed
Dr. Mudassar Razzaq
Dr. Zahra Lakdawala

COMPUTATIONAL FLUID DYNAMICS AND FLUID STRUCTURE INTERACTION

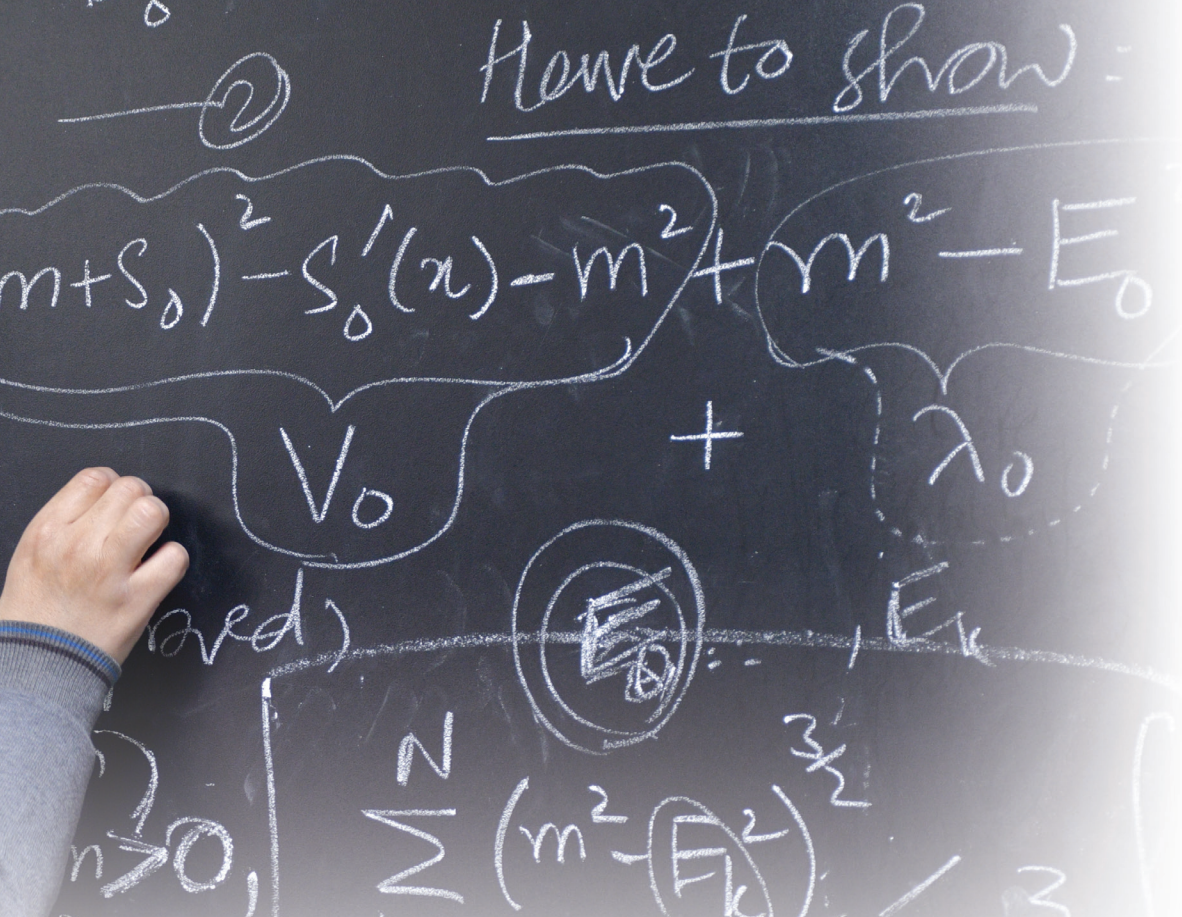
Dr. Mudassar Razzaq
Dr. Zahra Lakdawala

OPERATOR THEORY

Dr. Masood Hussain Shah

APPLIED ALGEBRA

Dr. Imran Anwar
Dr. Haniya Azam
Dr. Shaheen Nazir



How will Mathematics help you realise your ambition?

The Department of Mathematics houses the following:

- Research groups working in the area of Computational Fluid Dynamics, Numerical Analysis and Scientific Computation, Financial Mathematics, Stochastic Portfolio Theory, Spectral Theory, Mathematical Analysis, Algebraic Geometry, Differential Systems, Operator Theory and Algebraic Topology.
- A High Performance Computing Centre provides computing facilities to faculty and students with specialised computational needs; engenders and facilitates science and engineering research efforts; and provides research and development exposure to students.
- The Centre for Advanced Studies in Mathematics (CASM) promotes the role of Mathematics in formulating and solving interdisciplinary problems among students, which is pivotal for scientific progress in every society.

Embrace the Mathematics experience

MS Math student, Ali Abbas Abedi was accepted to the Singapore University of Technology and Design (SUTD) in 2020 to pursue a PhD in the field of computational chemistry.

- The Department commenced the John Conway Spirited Seminar Series from February 2021 that continues to feature distinguished speakers from across the globe.
- PhD student, Mohsin Ali, along with Associate Professor, Dr. Adnan Khan, were part of a team that scrutinised transmission dynamics of COVID-19 through mathematical modelling and have tried to understand the significance of pharmaceutical intervention in the deployment of a strict lockdown, which may help guide public healthcare policy. This work has been published in the journal, *Letters in Biomathematics*.



DR. MUHAMMAD SABIEH ANWAR

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

"The graduate programmes in science and engineering at SBASSE are poised to make an impact. Our deepest impact as an institution would truly be made by the research that emanates from our graduate education and the research that it propels. We are committed to providing a collegial, rigorous and progressive research milieu that triggers the thirst for knowing more and seeking the truth, and in the process, creating tools, gadgets, machines and ideas that address the human condition and global issues. We promise that our graduate programmes will make you ride through the two extremes of the microcosm and the macrocosm, the ideal and the practical, the abstract and the tangible. Welcome to the Syed Babar Ali School of Science and Engineering!"



YOUR JOURNEY BEGINS HERE!

Admission Criteria for Local and International Students

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

MS Programme

- Academic Record
- Performance in Admission Tests
- Application Review
- Submission of complete online application, application processing fee and supporting documents by the stipulated deadline
- Interview Performance (If needed)
- Letter of Recommendation

PhD Programme

- Academic Record
- Performance in Admission Tests
- Application Review
- Research Statement
- Submission of complete online application, application processing fee and supporting documents by the stipulated deadline
- Letters of Recommendation and
- Interview Performance (If shortlisted)

Note: This is the minimum criteria that applicants need to fulfil in order to be eligible to apply. Fulfilment of this criteria does not guarantee admission to LUMS.

For further details, please visit
<https://lums.edu.pk/graduate>



DR. IMRAN ANWAR

Associate Professor and Chair, Department of Mathematics

“The Mathematics graduate programmes are equipped with rigorous coursework covering all core areas of the field. The faculty is committed to high quality teaching, driven towards conceptual learning and excellent research. The Mathematics Department is a hub of various scholarly activities that include seminars and workshops. The graduate students’ seminar is another forum where students and faculty meet and discuss mathematical theories and problems regularly.”

Admission Criteria for PhD Programme for Foreign Nationals

SBASSE's PhD application for foreign nationals caters to applicants who currently reside outside Pakistan and have a foreign nationality.

All other applicants (i.e. those who have dual nationality, are Pakistani nationals, or are overseas Pakistanis) are required to apply through the regular admission application.

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

- Academic Background
- Research Background
- Online Test and Interview (If shortlisted)

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

<https://international.lums.edu.pk>

LUMS Graduate Programme Financial Support

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
- Partial tuition fee waivers for MS Basic Sciences students
- LUMS Interest-free Loan that covers partial to full tuition fee expense (only for local applicants)
- External Scholarships (support and eligibility for these scholarships vary depending on the donor)
- Options to work as Research or Teaching Assistants (subject to availability)
- Full funding of the PhD, which covers tuition, registration, admission fee and a monthly stipend for four (4) years.

For details, please visit

<https://financial-aid.lums.edu.pk/graduate-financial-aid>



MUHAMMAD ADNAN ANWAR

PhD 2018

"The Department of Mathematics at LUMS has stellar academic resources. The professors are world-class scholars, and very passionate about their subject area and really care about their student's mental and professional wellbeing. There are multiple opportunities for self-development through sports, academics, and TAs. From a research perspective, it allows students to work in applied, applicable and fundamental aspects of mathematics under the supervision of active researchers."

FOR FURTHER DETAILS, VISIT

MS PROGRAMME:

[HTTPS://LUMS.EDU.PK/PROGRAMMES/MS-MATHEMATICS](https://lums.edu.pk/programmes/ms-mathematics)

PHD PROGRAMME:

[HTTPS://LUMS.EDU.PK/PROGRAMMES/PHD-MATHEMATICS](https://lums.edu.pk/programmes/phd-mathematics)

PHD PROGRAMME (FOREIGN NATIONALS):

[HTTPS://LUMS.EDU.PK/PROGRAMMES/PHD-MATHEMATICS-FOREIGN-NATIONALS](https://lums.edu.pk/programmes/phd-mathematics-foreign-nationals)

DHA, LAHORE CANTT. 54792, LAHORE, PAKISTAN

Ph: +92-42 111- 11- LUMS (5867) Ext: 2177

Email: admissions@lums.edu.pk

Website: www.lums.edu.pk



#LearningWithoutBorders