



# MATHEMATICS

MS and PhD Programmes

Fall 2019



LUMS

**SBASSE** | SYED BABAR ALI SCHOOL OF  
SCIENCE AND ENGINEERING

SBASSE offers  
Undergraduate,  
Graduate and  
Doctoral  
degrees

6

disciplines:  
Biology  
Chemistry  
Computer Science  
Electrical Engineering  
Mathematics  
Physics

## CREATING A BETTER WORLD WITH LUMS SBASSE

Syed Babar Ali School of Science and Engineering (SBASSE) imparts top-quality education in Science and Engineering with a vision to carry-out world-class, multidisciplinary education and research.

The MS Programmes at SBASSE are rigorous and designed to impart specialised professional and research oriented training to students. To graduate, students must complete 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 or a thesis. Major milestones that must be achieved for the successful completion of the PhD degree include the Comprehensive (Qualifying) Examination, Thesis Proposal Defense, Research Publication(s) and PhD Thesis Defense.

During the course of study, students learn through lectures, tutorials, laboratory work, problem-solving exercises, research projects and frequent interaction with experienced faculty members and advisors.



"The Department of Mathematics at LUMS offers an excellent environment to study Mathematics and its applications. It was ranked number 1 in Pakistan by the QS World University Rankings 2016. Students joining our graduate community can expect to be immersed in a rigorous degree programme that will quickly move them to the frontiers of real world mathematical challenges. Our faculty has a diverse set of experiences and shall continue striving for excellence in core research areas which include differential equations, numerical analysis, optimisation, probability theory, mathematical biology and others.

I have been privileged to have spent nine years at SBASSE and be a part of world-class faculty which is dedicated to work across a broad-spectrum of both, Pure and Applied Mathematics. Moreover, LUMS has been a great learning experience, particularly teaching and mentoring the brilliant talent of the country. Hence, I strongly believe that if you are ready to work with a dynamic group of faculty and students, if you are motivated and ready for the challenges of mathematical study, then LUMS is a perfect place to explore a degree in Mathematics."

**Dr. Imran Naeem**  
Associate Professor and Chair,  
Department of Mathematics

# WHY CHOOSE SBASSE

- Top academic offers:  
MIT, University of Warwick,  
London School of Economics,  
University of Oxford, University  
of Cambridge etc.
- Hiring by top local and  
international organisations:  
Microsoft, Google, Facebook,  
Packages Ltd.

# 60%

graduates placed on jobs  
within the first year of  
graduation

# 75

research  
active faculty  
members  
from top-tier  
universities

## COLLABORATIONS WITH NATIONAL AND INTERNATIONAL EDUCATIONAL INSTITUTIONS

- Institute of Electronics and Telecommunication of Rennes (IETR) Research Laboratory, Rennes France
- Singapore University of Technology and Design (SUTD), Singapore
- Supelec, France
- Texas A&M University, Qatar
- CoNNekT Lab, NUST School of Electrical Engineering and Computer Science (SECS)

## INTERDISCIPLINARY PROGRAMMES

The rigorous curriculum of the Graduate Programmes at SBASSE provides a multidisciplinary learning environment. Students get the opportunity to work with knowledge drawn from all 6 disciplines as a part of the free elective requirement.

## GLOBAL EXPOSURE THROUGH INTERNATIONAL EXCHANGE PROGRAMMES

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

## FINANCIAL SUPPORT

From scholarships, loans, work options and partial tuition fee waivers for MS students to full funding and research grants for PhDs, the School offers substantial support to promote the study of Science and Engineering disciplines.

## TOP-QUALITY PUBLICATIONS

Research by graduate students has been published in top-quality journals

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  
Journals

Journal of  
Computational  
and Applied  
Mathematics

SBASSE ranks between  
451-500 in QS World  
Rankings by Subject  
2018 in Engineering  
and Technology



# MS | PhD MATHEMATICS

## QUICK FACTS



LUMS Mathematics Department was ranked Number 1 in Pakistan by the QS World University Rankings by Subject 2016.

## HOW WILL YOU LAUNCH YOUR NEW WORLD?

Mathematics is the most fundamental of all the sciences and also the most applicable as it is the rigorous study of structure, relationships and pattern. The faculty at the Department of Mathematics works across a wide-spectrum of Mathematical fields. The Department is dedicated to conducting research work in Pure as well as Applied Mathematics. Some examples of interest within Pure Mathematics are Algebraic Geometry, Algebraic Topology, Combinatorial Commutative Algebra, Functional Analysis, Fixed Point Theory, Operator Theory and Symmetries of Differential Equations, while those in Applied Mathematics include Computational Statistical Mechanics, Numerical Methods, Mathematical and Computational Biology, Stochastic Processes, Epidemiology and Cancer Kinetics.

## WHAT WILL YOUR NEW WORLD INVENT?

Students at the Department of Mathematics work closely with faculty who 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:

- **Algebraic Topology**  
Dr. Haniya Azam
- **Algebraic Geometry**  
Dr. M. Imran Qureshi  
Dr. Shaheen Nazir
- **Spectral Theory and Quantum Graphs**  
Dr. Muhammad Usman
- **Mathematical Biology, Mathematical Analysis**  
Dr. Adnan Khan  
Dr. Ali Ashher Zaidi
- **Operator Theory**  
Dr. Masood Hussain Shah
- **Financial Mathematics, Stochastic Portfolio**  
Dr. Azmat Hussain
- **Evolution Equations**  
Dr. Imran Naeem  
Dr. Muhammad Ahsan
- **Fluid Structure Interaction, Optimisation**  
Dr. Mudassar Razzaq
- **Scientific Computation**  
Dr. Sultan Sial  
Dr. Amer Rasheed  
Dr. Mudassar Razzaq

## Mohsin Ali | PhD Mathematics

“Graduate studies at LUMS enable you to explore different professional opportunities especially research. LUMS has vast resources, providing everything that you need for your graduate studies. Also, LUMS provides financial support which qualifies you to achieve success in your life. Being at this platform, you get chances to go abroad for higher studies and conferences. I would highly recommend graduate studies in Mathematics at LUMS.”



## HOW LUMS SBASSE WILL HELP YOU REALISE YOUR AMBITION

- The Department houses Research Labs working in the area of Financial Mathematics, Stochastic Portfolio, Spectral Theory, Mathematical Analysis, Algebraic Geometry, Scientific Computation, Evolution Equations, Operator Theory and Algebraic Topology
- The 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. It organises conferences, workshops and seminars for a conducive research environment and strengthens international collaborations with the Mathematics community.

## QUICK FACTS

For intensive computing and simulation purposes, the Department houses one of the most powerful computing resources in Pakistan: The High-Performance Cluster Computing Centre (HPCC).

### Dr. Adnan Khan | Associate Professor, Department of Mathematics

“Here at LUMS, I have worked with colleagues and students in several areas of Applied Mathematics, including Epidemiology, Finance and Statistical Inference. The research interests of the faculty on the applied side include Computational Fluid Mechanics, Numerical Methods, Symmetry Analysis of Differential Equations, Mathematical Biology, Quantum Mechanics, Optimisation, and Quantitative Finance. On the pure side, faculty interests are in Algebraic Geometry, Topology and Operator Theory. These are all areas of current interest and research, internationally. Exciting foundational and advanced courses, an opportunity to participate in cutting edge research and a collegial atmosphere, along with substantial financial support makes this one of the best programmes for graduate work in Mathematics in Pakistan.”



## EMBRACE THE SBASSE EXPERIENCE

**1** SBASSE student, Faaz Arbab has manufactured GOBEE, Pakistan's first voice-operated smart wheel chair. GOBEE has received the best Consumer Product and Design Award (2018).

---

**2** The Nuclear Magnetic Resonance (NMR) Lab, inaugurated in January 2018, aims to study the structural aspects of molecules.

---

**3** Dr. Ihsan Ayyub Qazi and Dr. Zafar Ayyub Qazi, CS faculty, have won the Google Faculty Research Award.

---

**4** SBASSE faculty, Dr. Rahman Shah Zaib Saleem and Dr. Amir Faisal have published their research in Bioorganic Medicinal Chemistry Letters.

---

**5** Research by Dr. Ihsan Ayyub Qazi has been selected as one of the two best papers by the ACM SIGCOMM Computer Communications Review (CCR) Editorial Board and will be presented at ACM SIGCOMM 2018 in Budapest, Hungary later this year.

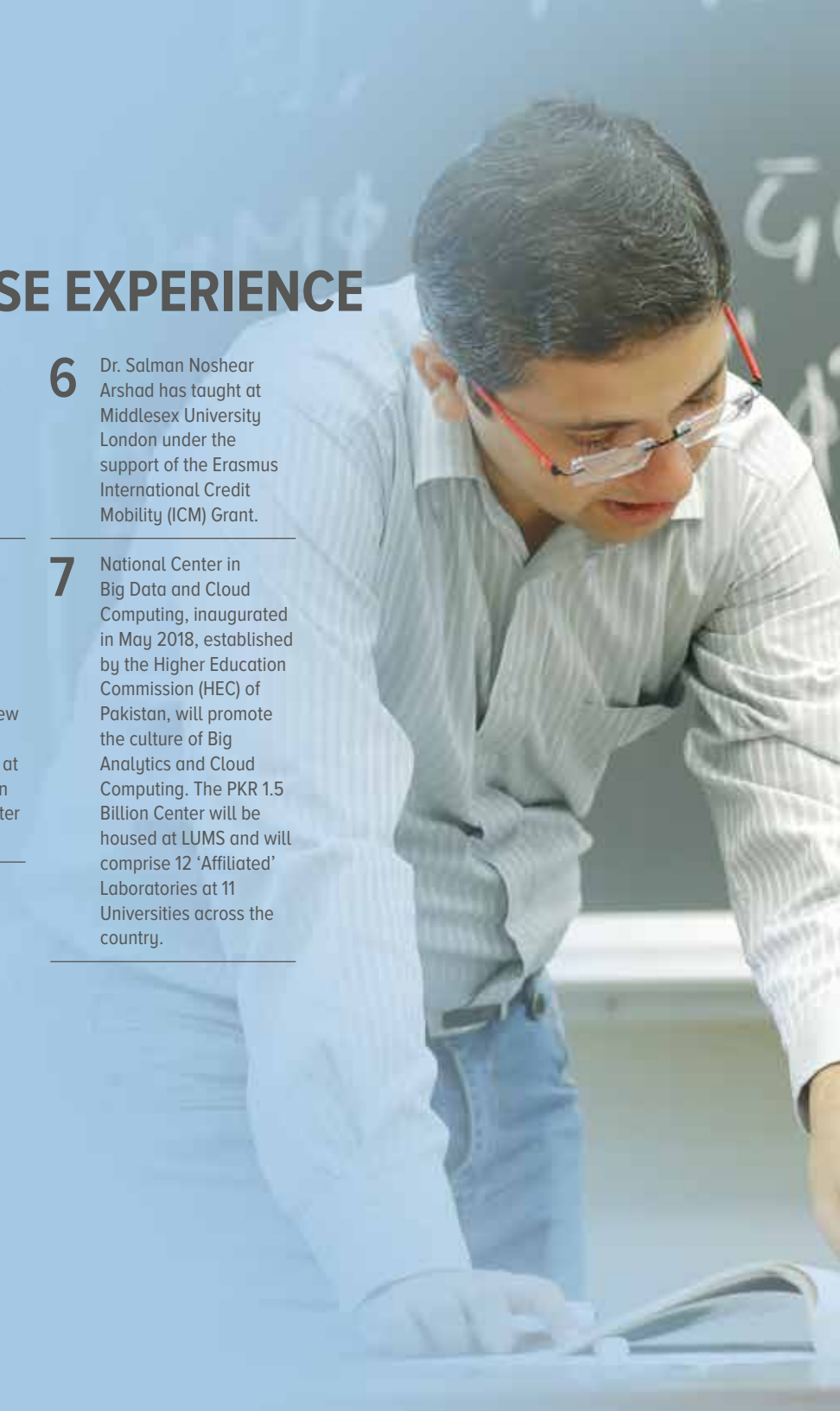
---

**6** Dr. Salman Noshear Arshad has taught at Middlesex University London under the support of the Erasmus International Credit Mobility (ICM) Grant.

---

**7** National Center in Big Data and Cloud Computing, inaugurated in May 2018, established by the Higher Education Commission (HEC) of Pakistan, will promote the culture of Big Analytics and Cloud Computing. The PKR 1.5 Billion Center will be housed at LUMS and will comprise 12 'Affiliated' Laboratories at 11 Universities across the country.

---





## YOUR JOURNEY BEGINS HERE!

### Admission Process

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

- Academic record
- Admission Test performance\*
- Interview performance

\*For admission test details, please visit

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

### Financial Support

Several funding opportunities are available to deserving MS and PhD students. These include:

- LUMS Interest Free Loan
- Merit Scholarships for MS Programmes
- External Scholarships (if available)\*
- 100% Scholarships for PhD students
- Partial tuition fee waivers for all MS students (Basic Sciences and Mathematics)
- HEC Research Grants
- Options to work as Research or Teaching Assistants

\*Support and eligibility for these scholarships vary depending on the donor.

For details, please visit

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

# CRITICAL DATES

Deadline to Apply  
**April 02, 2019**

Deadline to take GRE  
**April 14, 2019**

LUMS Graduate  
Admission Test and  
SBASSE Subject Test on  
**April 14, 2019**

Admission Decisions  
**June - July 2019**

Classes Commence  
**September 2019**

## LAHORE UNIVERSITY OF MANAGEMENT SCIENCES (LUMS)

DHA, Lahore Cantt. 54792, Lahore, Pakistan

☎ +92 42 111 - 11 - LUMS (5867) Ext. 2177

✉ admissions@lums.edu.pk

🌐 www.lums.edu.pk



**#KEEPPROGRESSPLACES #MERITMATTERS**