



BIOLOGY

MS and PhD Programmes

Fall 2019



LUMS

SBASSE | SYED BABAR ALI SCHOOL OF
SCIENCE AND ENGINEERING

CREATING A BETTER WORLD WITH LUMS SBASSE

SBASSE offers Undergraduate, Graduate and Doctoral degrees

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 Biology has grown immensely in the last ten years. Having started as an undergraduate department, it now offers rigorous graduate and doctoral programmes. These programmes are designed to impart cutting edge knowledge of 21st century Biology through an interdisciplinary curriculum, which exposes the students to theoretical as well as experimental aspects of modern-day Biology. With numerous research opportunities and state-of-the-art laboratory facilities, the Department offers its students an academically rich and intellectually stimulating environment.

Experienced and internationally recognised faculty members are working on a wide array of research topics including epigenetics and gene regulation, structural biology of viruses such as HIV and HCV, cancer cell signalling and therapeutics, molecular epidemiology, plant disease resistance as well as computational and systems biology. The research-active environment and quality-focus approach has resulted in our graduates securing fully funded MS/ PhD positions in some of the best universities around the world including Harvard, Yale, Cornell, Duke and Oxford amongst several others."

Dr. Aziz Mithani
Assistant Professor and Chair,
Department of Biology

6

disciplines:
Biology
Chemistry
Computer Science
Electrical Engineering
Mathematics
Physics

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 BIOLOGY

QUICK FACTS



Our specialised laboratories have established *Arabidopsis*, Fruit flies, Mammalian Cells as model systems.

HOW WILL YOU LAUNCH YOUR NEW WORLD?

The Department of Biology offers MS and PhD Programmes with specialisations in Molecular Biology and Bioinformatics. State-of-the-art research laboratories, experienced faculty along with a collaborative environment with a strong focus on research in areas like Cancer Cell Signalling, Structural Biology related to Viruses, Bacterial Pathogenesis and Diabetes, Epigenetic, Genome Evolution, Bioinformatics, and Virology, contribute to the Programmes' competitive edge. The lectures and tutorials are backed by experiments and project work in the laboratories.

WHAT WILL YOUR NEW WORLD INVENT?

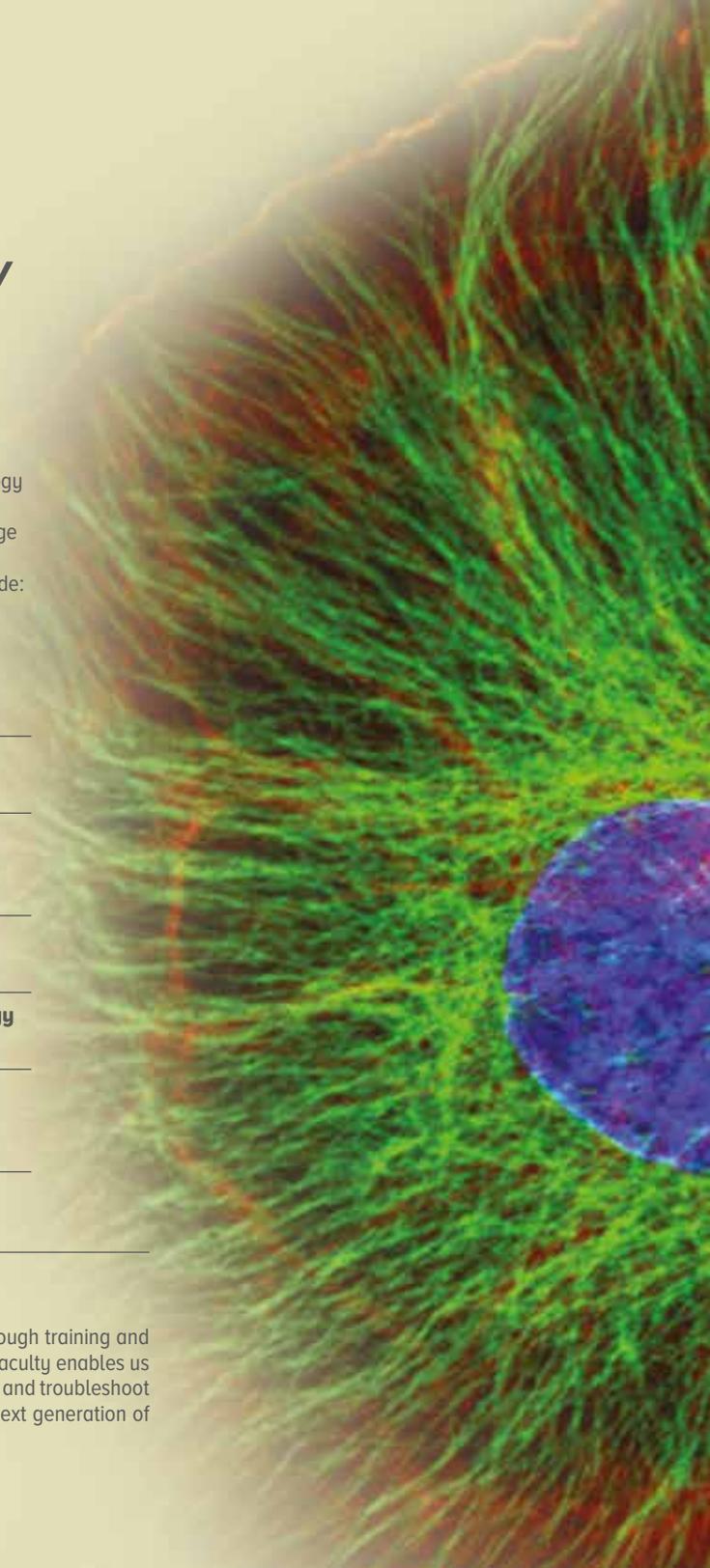
Research is an essential component of the Biology Graduate Programmes. In this context, students are exposed to advanced courses in a wide-range of research areas. Different research groups in Biology led by individual faculty members include:

- **Biochemistry and Structural Biology**
Dr. Syed Shahzad ul Hussan
- **Cell Signalling and Cancer Therapeutics**
Dr. Amir Faisal
- **Computational Genomics and Systems Biology**
Dr. Aziz Mithani
- **Epigenetics**
Dr. Muhammad Tariq
- **Molecular Epidemiology and Microbiology**
Dr. Shaper Mirza
- **Systems Biology, Proteomics and Health Informatics**
Dr. Safee Ullah Chaudhary



Rahim Ullah | PhD Candidate in Biology

“PhD at LUMS provides an amazing experience that involves intensive course work, thorough training and an opportunity to do cutting edge research. Multidisciplinary training by highly qualified faculty enables us to address pertinent scientific questions. The Programme also enables us to think critically and troubleshoot when we encounter problems. I believe the PhD Programme at LUMS will produce the next generation of scientists who can advance scientific research in this country.”



HOW LUMS SBASSE WILL HELP YOU REALISE YOUR AMBITION

Research Facilities

- State-of-the-art equipment include confocal microscope, fluorescence activated cell sorter (FACS), fast protein liquid chromatography (FPLC), MiSeq Next Generation Sequencer, conventional and real time thermocyclers, ultrasonic bioruptor, gel documentation systems, high-speed centrifuges, tissue culture facilities and access to high-resolution 600 MHz NMR
- The Bioinformatics Research Laboratory houses a dedicated HPC facility for High-Performance Computing (HPC)
- HPC nodes as well as General Purpose Graphical Processing Units (GPGPU) including NVIDIA's Grid K2 and Tesla K40C are available at the Lab
- Several in-house software tools available online to leverage the lab's GPGPUs and HPCs
- Specialised laboratories have established *Arabidopsis*, fruit flies, mammalian cells as a model system

Career Opportunities

SBASSE graduates receive offers from leading universities of the world like Massachusetts Institute of Technology, Stanford University, University of Oxford, University of Cambridge, Harvard University and University of Illinois Urbana-Champaign to pursue higher studies.

Graduates find direct placements at various local as well as international universities where they get the opportunity to teach as faculty members.

Students work alongside faculty members at SBASSE as Teaching Assistants and Research Assistants.

QUICK FACTS



We have a dedicated High-Performance Computing (HPC) facility housed within the Bioinformatics Research Laboratory.



Kamran Tariq | MS Biology 2017

"LUMS is renowned for its rigorous coursework and state-of-the-art research facilities. My MS degree at LUMS prepared me to meet the demanding requirements of pursuing a doctorate at Dartmouth. The faculty of LUMS focuses heavily on the scientific training of its students and the alumni of Biology Department have built a reputation for themselves in universities all around the world. This network not only gives students an advantage when applying to graduate schools abroad but also develops a strong sense of community among LUMS graduates."

QUICK FACTS



Students are regularly admitted into top universities around the world on fully funded scholarships.

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 & 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 Nosheer 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.



Dr. Shaper Mirza | Associate Professor, Department of Biology

"The aim of the Biology Programme is to prepare young scientists with a thorough understanding of principles and applications of biology. The Programme emphasises on inquiry-based coursework to provide opportunities for improving critical thinking and problem-solving skills. Students are exposed to research through research-intensive coursework, internships, independent study projects, and a senior-year original research project. The outcome therefore is that students are well rounded and prepared for a career in science, healthcare, education and research."





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