

A close-up photograph of a microscope's objective lenses, with a hand visible in the foreground adjusting a component. The lighting is dramatic, with a blue tint and a bright light source creating a lens flare effect.

CHEMISTRY

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 Chemistry has recently evolved into the Department of Chemistry and Chemical Engineering, which is an impactful transition, bringing scientists and engineers under one roof. I believe that this Department has a very bright future and is on track to become a regional leader in education and research in chemical sciences.

The faculty of the Department has provided a truly revolutionised model of teaching and research in chemical sciences in the Pakistani context, which is making the SBASSE's dream of bringing a paradigm shift in the quality of education and research, a reality! Close to a hundred percent success rate for the admissions of Chemistry graduates in leading graduate schools such as, MIT, Princeton, Cornell, University of Chicago, Rice, UIUC on full scholarships is an evidence of the quality of the learning experience the students are being offered by our Department. Our curriculum design is unique and exposes our students to a wide variety of knowledge spread over different schools at LUMS. This is unparalleled in the history of educational practices in Pakistan.

Our Department has recently started interfacing with the industry and fostering the industry-academia cooperation in its true sense. Our goal is to become a centre of innovation with an ambition of making a real life impact. I believe a stream of products, processes and technologies will get translated from the benches of our Department to the real life during the next few years. One of our aims is to inspire our students to work for the benefit of society at large through service to industry, academia, non-profit organisations and government; and by promoting the scientific and technological foundation of debates on various national and global challenges facing society."

Dr. Basit Yameen
Associate Professor and Chair,
Department of Chemistry and Chemical Engineering

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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

- University of Strathclyde
- University of Cambridge
- University of New South Wales
- Queensland University of Technology
- TOBB University of Economics and Technology
- University of Edinburgh
- EPFL
- MIT
- University of Massachusetts, Amherst
- University of Liverpool
- Marburg University
- Huazhong University of Science and Technology
- Michigan State University
- University of Mississippi
- KAUST
- Federal University of Rio de Janeiro
- University of Bristol
- Freie University
- Heidelberg University
- NIBGE
- PIEAS
- Quaid-i-Azam University
- International Center for Chemical and Biological Sciences (ICCBS), University of Karachi
- UVAS, Lahore

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 VARIOUS 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 CHEMISTRY

QUICK FACTS



Chemistry faculty maintains international collaborations with prominent national and international research groups in USA, UK, Germany, Switzerland, Turkey, China and Saudi Arabia.

HOW WILL YOU LAUNCH YOUR NEW WORLD?

The Department of Chemistry and Chemical Engineering aspires to establish itself as an internationally recognised and globally competitive centre for graduate teaching and research in a wide variety of chemical disciplines that include Nanoscience and Nanotechnology, Materials Chemistry, Catalysis, Drug Discovery and Medicinal Chemistry. In the near future, the Department is also expected to initiate its research-intensive science-based Chemical Engineering Programme to educate tomorrow's leaders in modern Chemical Engineering and to support Pakistan's growing chemical industry.

The mission of the Department is to produce outstanding graduates who can excel in academia and the industry and hence become future leaders. The Chemistry graduate programme is an exciting opportunity for students to take advantage of the Department's thriving research environment and to further contribute effectively to the development of science.

WHAT WILL YOUR NEW WORLD INVENT?

The Department of Chemistry and Chemical Engineering comprises of a diverse group of research active faculty members. In addition to the traditional areas of Chemical Sciences, they work on interdisciplinary research projects interfacing Chemistry with other Science and Engineering disciplines. Faculty members and their research interests are as follows:

- **Catalysis and Green Chemistry**
Dr. Ghayoor Abbas Chotana
- **Multifunctional Nano-Composites**
Dr. Salman Nosheer Arshad
- **Functional Nanomaterials**
Dr. Irhsad Hussain
- **Polymers and Nanocomposites**
Dr. Habib-ur-Rehman
- **Synthetic, Organic and Bioorganic Chemistry and Chemical Biology**
Dr. Muhammad Saeed
- **Drug Discovery**
Dr. Rahman S. Z. Saleem
- **Solid State Chemistry**
Dr. Falak Sher
- **Soft Matter and Interfaces**
Dr. Basit Yameen
- **Catalyst Design**
Dr. Muhammad Zaheer

Qasim Qayyum Kashif | MS Chemistry 2017

"The opportunities I have had at LUMS, the things I got to do and the time I spent with faculty and friends was the best. The medley of modules broadened my intellectual aptitude. The actual assignments and projects I did during my course, taught me a lot – not just in theory, but also in practice. LUMS is not just an institute, it's a lifestyle."



HOW LUMS SBASSE WILL HELP YOU REALISE YOUR AMBITION

- Students benefit from the excellent research facilities at the Department of Chemistry and Chemical Engineering and extensive research programmes in the following areas:
 - Nanoscience and Nanomedicine
 - Cancer Therapeutics
 - Drug Discovery and Delivery
 - Synthetic Organic Chemistry
 - Green Chemistry and Catalysis
 - Renewable Energy
 - Polymers and Nanocomposites
 - Organometallic Chemistry
 - Electronic Materials
 - Natural Product Chemistry
 - Biomass Conversion
 - Environmental Chemistry
- The Chemistry faculty has developed impactful international collaborations with prominent national and international research groups in USA, UK, Germany, Switzerland, Turkey, China and Saudi Arabia. These collaborations are instrumental in keeping the faculty abreast of the latest developments in the field and to use advanced technology platforms and high-tech equipment that are currently not available anywhere in Pakistan.
- Chemistry teaching and research labs are well equipped with state-of-the-art experimental facilities and equipment. There is a fine collection of supplies and equipment including spectroscopic, structural and materials characterisation tools.
- Students work closely with faculty who have published research articles in highly prestigious and high-impact international journals including Nature, Nature Materials, Advanced Materials, Angewandte Chemie Int. Ed., Journal of the American Chemical Society, Nano Letters, ACS Journal of Medicinal Chemistry etc. Since the inception of SBASSE, the faculty at the Chemistry Department has published more than 140 articles in peer reviewed journals of high international repute.

QUICK FACTS



Teaching and research labs are well equipped with state-of-the-art experimental facilities and supplies.



The Department collaborates with local industry leaders such as Bulleh Shah Packaging Pvt. Ltd., Packages Ltd., DIC Pakistan Ltd., Tri-Pack, Engro Polymers & Chemicals Ltd., Fatima Fertilizer Company Ltd., just to name a few.



Rida Ibrahim | MS Chemistry 2017

“LUMS is the best option for doing MS Chemistry in Pakistan and is a great stepping stone if someone wishes to pursue a PhD from abroad. Here you are provided with a top-notch environment in both academics and research. Our highly qualified and friendly faculty really makes learning a joy. By providing financial assistance to deserving students, LUMS makes its high-quality education accessible to all.”

QUICK FACTS



Students work closely with faculty on research projects.

EMBRACE THE SBASSE EXPERIENCE

- 1** SBASSE student, Faazib 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.



Dr. Irshad Hussain | Associate Professor, Department of Chemistry and Chemical Engineering

"Having spent over 10 years at LUMS, I have witnessed the development of the Chemistry Department that is now transitioning to the Department of Chemistry and Chemical Engineering with excellent research facilities to work with. Our outstanding faculty members, superb staff and intellectual students have created an enabling environment for creative learning. LUMS' exceptional support for research, mobility and the independence offered to the faculty and students have enabled many colleagues to develop effective collaborations with industry and the leading research groups across the globe to work on diverse research problems of national importance and global relevance. The rigorous curriculum and research facilities/environment offered by the LUMS world-class faculty members enable our graduate students to excel in their careers. Come join LUMS, where the only thing that matters is merit."

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>



Soneela Asghar | PhD Chemistry 2014

“SBASSE, as an emerging scientific hub, is providing remarkable opportunities for doctoral training. Pursuing a PhD degree at the Chemistry Department fostered in me a working spirit and motivation to explore high-impact research areas. The brilliant and approachable cohort of mentors here helped and guided me through my journey at LUMS and made it possible for me to perform extremely well.”

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

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