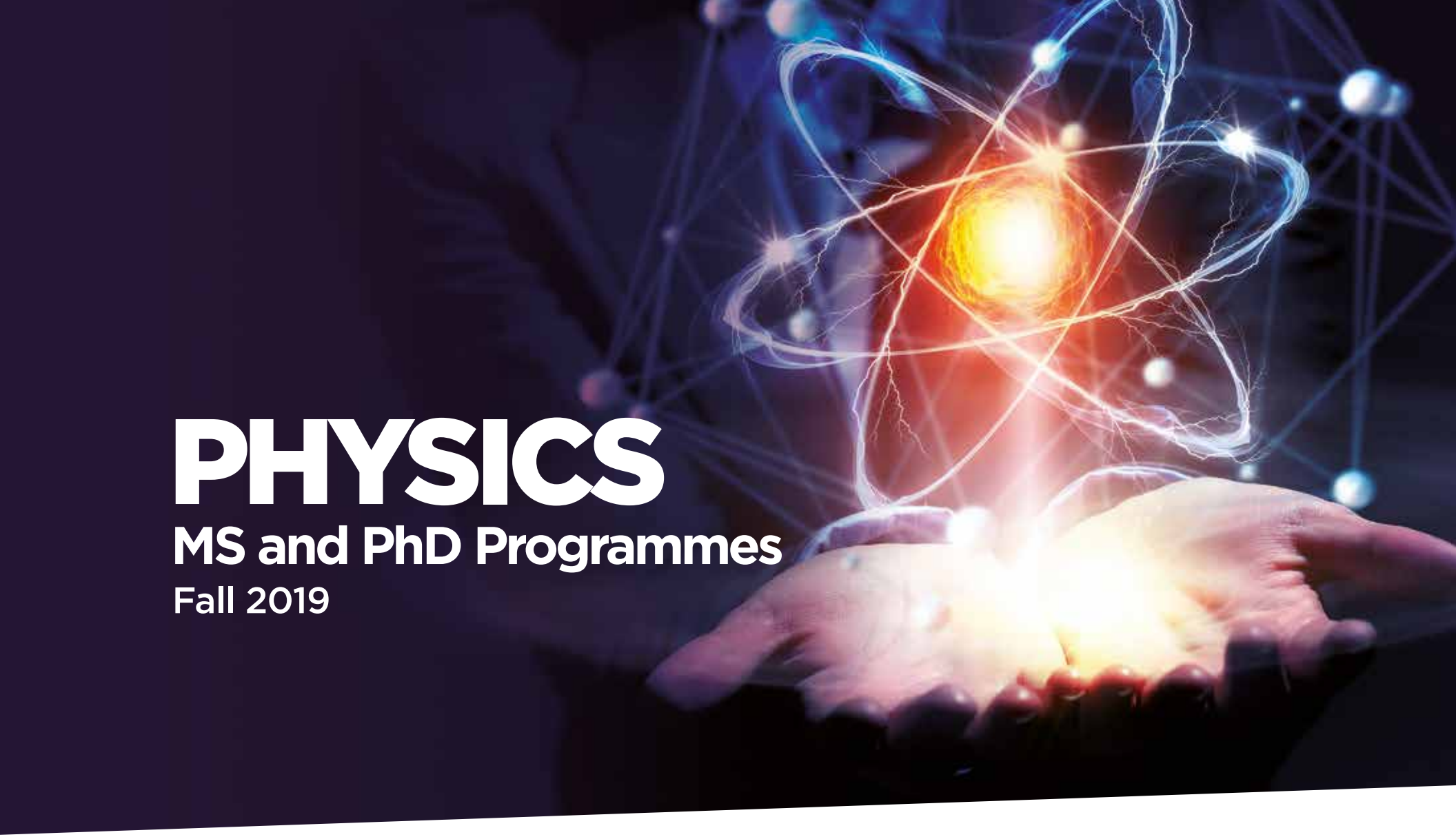


PHYSICS

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.

6
disciplines:
Biology
Chemistry
Computer Science
Electrical Engineering
Mathematics
Physics

"Physics is one of the most fundamental sciences, building upon the tradition of thousands of years of human inquiry based on observation, mathematical reasoning, and sense of inventiveness. Through semiconductors, optics and electronics, it has transformed the way we communicate and share information and ideas in this interconnected planet, and through a probing of the properties of matter and energy, it has advanced our mastery of the natural world and helped us use these resources for satiating our never-ending needs in energy, health, education, food and agriculture, and astronomical exploration. Both the fundamental and the applied physics continues to inspire the best brains to explore the underlying theories governing the universe around us all the way from the subatomic scale to galaxies, and use this knowledge for the betterment of humanity.

The Physics Department at SBASSE has an outstanding teaching and research environment where our students can relish this relentless quest for appreciation of our material surroundings and assist in our goal of enhancing the country's and region's intellectual, economic and material capital. The thrust is interdisciplinary and the focus is on strong mathematical and physical basics as well as on a keen appreciation of applications. Through a rigorous curriculum taught by an exciting group of people hailing from diverse training in particle physics, string theory, spintronics, optics and condensed matter physics, and supported by modern, state-of-the-art experimental facilities, we promise to enrich our students' learning experience."

Dr. Muhammad Faryad
Assistant Professor and Chair,
Department of 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 (SEECS)

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

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

MS | PhD PHYSICS

QUICK FACTS

Our top ranked faculty are part of national committees providing leadership to the country's science-related programmes.

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 with cutting edge and high-impact research.

WHAT WILL YOUR NEW WORLD INVENT?

The Physics faculty is actively engaged in cutting edge research in leading 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 interests include:

- **Spin and Photon Physics**
  Dr. Muhammad Sabieh Anwar
- **Quantum Dynamics**
  Dr. Adam Zaman Chaudhry
- **Plasmonics and Nanoengineered Materials**
  Dr. Muhammad Faryad
- **Fundamental Theory**
  Dr. Babar Ahmed Qureshi
- **Cosmology**
  Dr. Maqbool Ahmad
- **Solar Cells and Optoelectronics**
  Dr. Ammar Ahmed Khan
- **Quantum Optics**
  Dr. Ata UlHaq

Asif Nawaz | MS Physics 2016

"There were many compelling reasons, which motivated me to become a part of this prestigious University such as the curriculum, the quality of research under the supervision of highly qualified faculty, well equipped labs and facilities and the excellent career placement after graduation. In addition to these, LUMS provides the chance to change the life of students who come from underprivileged by providing full financial support. Learning under the remarkable Physics faculty equipped me with skills and knowledge to face the challenges of the world."

HOW LUMS SBASSE WILL HELP YOU REALISE YOUR AMBITION

The Department of Physics provides an excellent environment to facilitate learning and research through various facilities:

- 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, such as 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 etc.
- Research groups headed by faculty members aiming to explore various fields of Physics

QUICK FACTS

Strong faculty-student ratio, leading to robust mentorship and student-centred class interactions

Physics teaching laboratories successfully replicated at other universities in Pakistan

Ali Raza Mirza | PhD Candidate in Physics

"I am currently doing my PhD in Quantum Computers, Quantum Cryptography, Quantum Metrology with my supervisor, Dr. Adam Zaman Chaudhry at LUMS. I would like to clear a misconception about LUMS that it is for students from elite families only. There is an excellent financial aid system in place at LUMS, which accommodates many students from humble backgrounds, like myself."

EMBRACE THE SBASSE EXPERIENCE

QUICK FACTS

Teaching and research support provided to other universities in Pakistan

1 SBASSE student, Faaiz 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. Ammar Ahmad Khan | Assistant Professor, Department of Physics

"Excellence in teaching and cutting edge research go hand in hand, and at the Department of Physics we prioritise both. Our core coursework is carefully designed to bolster and then expand our students' knowledge and understanding of all the major areas of Physics. We offer many rigorous, specialised elective courses to allow students to choose an area that excites them. Furthermore, we strive to impart transferable skills such as academic writing, presenting, critical thinking, computer programming and the science of experimentation."

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

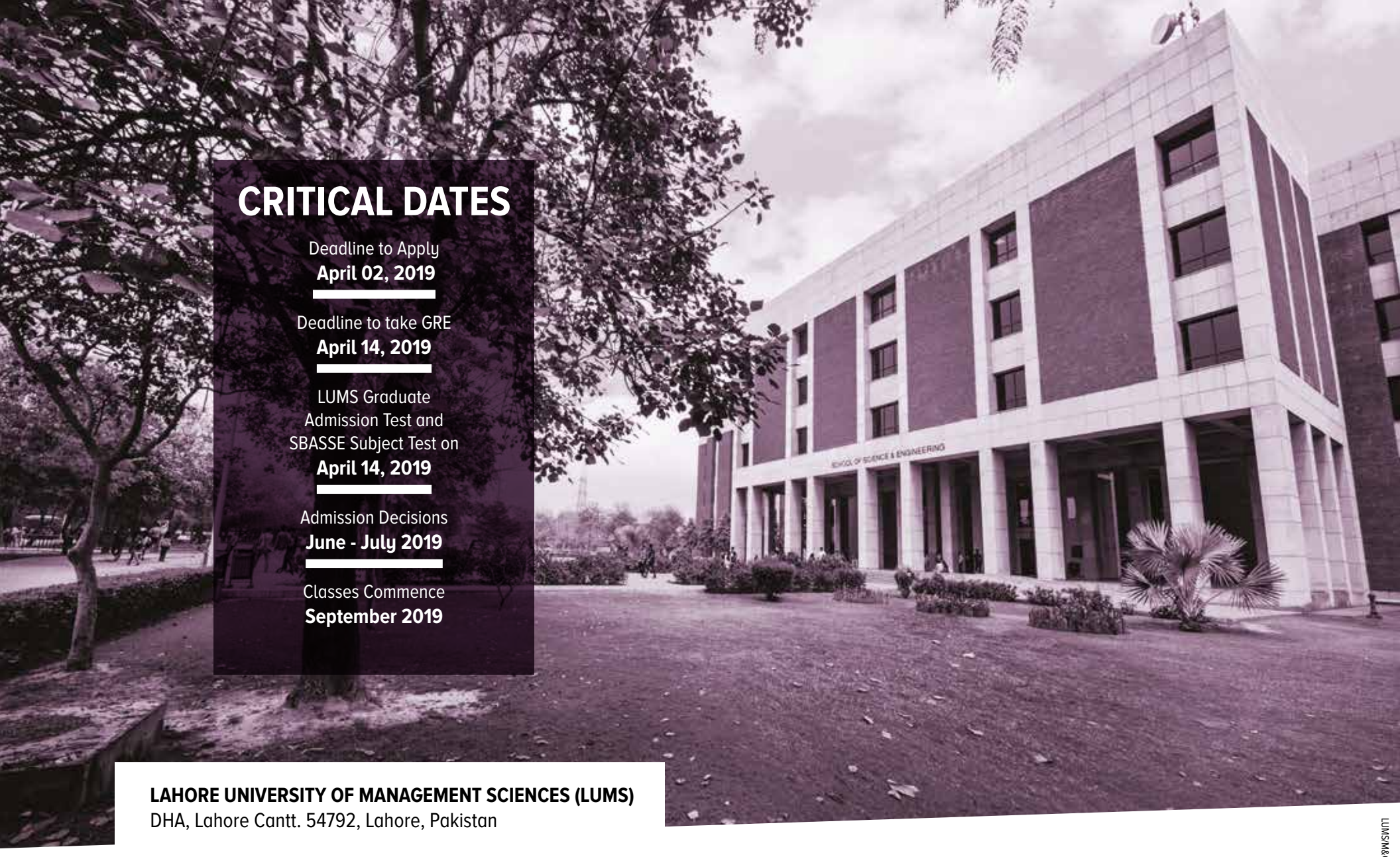
Financial Support

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

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www.lums.edu.pk

#KEEPGOINGPLACES #MERITMATTERS

LUMS/M&C/SBASSE/PHY/BOOKLET/10-18/V1