



ELECTRICAL ENGINEERING

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.



"I have had the honour and privilege of seeing the SBASSE dream materialise through the untiring efforts of a dedicated group of volunteers who came together to conceptualise a science and engineering research school in Pakistan. Since its inception, I have been lucky to have worked very closely with SBASSE admissions, the core curriculum, academic policies and programme requirements, all through the quarter to semester transition and beyond in the capacity of Associate Dean, Undergraduate Programmes, School of Arts and Sciences, the first Registrar of LUMS and of recent as Chair, Department of Electrical Engineering. The ride has been exciting, incredible and turbulent but worth every bit. It simply gives one hope and inspiration and is living proof that great things can still be achieved despite the odds in Pakistan, provided that one stays on course. These are just the first few steps of a great institution in the making and I am truly privileged to work with fantastic colleagues and a great team."

Dr. Tariq Mahmood Jadoon
Associate Professor and Chair,
Department of Electrical Engineering

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 INTERNATIONAL EDUCATIONAL INSTITUTIONS

- Singapore University of Technology and Design (SUTD), Singapore
- Supelec France
- Australian National University, Australia
- University of Kaiserslautern, Germany
- University of Colorado Boulder, USA
- King Abdullah University of Science and Technology, Saudi Arabia
- KOC University, Turkey
- University of Maryland, USA
- Umul Qara University, Saudi Arabia
- Massachusetts Institute of Technology (MIT), USA

INTERDISCIPLINARY PROGRAMMES

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

GLOBAL EXPOSURE THROUGH INTERNATIONAL EXCHANGE PROGRAMMES

MS and PhD students participate in various exchange programmes and research opportunities sponsored by Ignite – National Technology 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

- IEEE Communications Letters
- IEEE Access
- IEEE Transactions on Smart Grid
- IEEE Transactions on Vehicular Technology
- IEEE Journal on Selected Topics in Signal Processing
- Eurasip Journal on Wireless Communications and Networking
- IEEE Journal of Photovoltaics
- IEEE Electron Device Letters
- IEEE Transactions on Audio, Speech & Language Processing
- IEEE Transactions on Signal Processing
- Applied & Computational Harmonic Analysis
- IEEE Signal Processing Letters
- Journal of Electronic Science and Technology
- Human Behaviour Understanding in Networked Sensing: Theory and Applications of Networks of Sensors
- Multimedia Tools and Applications

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



MS | PhD ELECTRICAL ENGINEERING

QUICK FACTS



With over 23 PhD faculty members, the Electrical Engineering is the largest Department at SBASSE.



EE faculty won a total of more than PKR 2.6 Billion in external grants.

HOW WILL YOU LAUNCH YOUR NEW WORLD?

The internationally reputable MS and PhD Electrical Engineering programmes, provide a research environment that is supported by international collaborations. Students gain a strong foundation in contemporary areas of Electrical Engineering and are strongly encouraged to collaborate with other disciplines at SBASSE.

Currently, faculty members are pursuing research programmes in the fields of

- Wireless Communication
- Optics and Electromagnetics
- Electronics and Embedded Systems
- Signal, Image and Video Processing
- Energy and Power Systems
- Semi-Conductor Devices and Nano-Electronics
- Computer Networks and Systems
- RF and Microwave
- Biomedical Imaging

WHAT WILL YOUR NEW WORLD INVENT?

State-of-the-art Research Facilities

The Centre for Water Informatics and Technology (WIT) has a disciplinary focus on hydro-informatics and systems analysis, while touching multidisciplinary research themes in water to provide the much needed, interdisciplinary perspective to water issues, under the guidance of a world-class advisory group.

Director: Dr. Muhammad Abubakr

Advanced Communications

(AdCom) Lab develops algorithms and solutions that are useful as well as practical. The Lab focuses on cross layer optimisation and networking problems in upcoming wireless systems (LTE/LTE-A), system-level aspects, efficient coding strategies, robust close-to-capacity designs for dirty-paper coding, and experimental implementation of relaying platforms and performance analysis of ultra wideband systems.

Directors: Dr. Momin Ayub Uppal, Dr. Ijaz Haider Naqvi and Dr. Naveed Ul Hassan

The AI & Robotics in Precision Agriculture and Forestry Research Cluster

is doing international and national projects in the field of precision agriculture and forestry. The aim is to develop indigenous ground and aerial mobile robotics solution for the agriculture sector of Pakistan from a purely technological perspective.

Director: Dr. Ahmad Kamal Nasir and Dr. Mian Awais

Bio-Agri Photonics (BAP) Lab

pursues projects that involve an innovative combination of electrical engineering, biology, chemistry, and physics to develop new and exciting solutions for various problems in healthcare and agriculture sectors.

Director: Dr. Muhammad Imran Cheema

The Clinical and Translational Imaging Lab,

launched in June 2018, will exploit engineering and applied mathematical tools to address problems at the frontier of smart healthcare, specifically research themes at the intersection of optimisation theory, deep learning, and multi-modality (medical) imaging.

Director: Dr. Hassan Mohy-ud-Din

CYPHYNETS conducts research on systems engineering, applied mathematics and robotics with a main focus on the development of Cyber-Physical Systems (CPS) for welfare, infrastructure, environment, natural resources and sustainable development in the context of Pakistan and the developing world.

Director: Dr. Muhammad Abubakr

Electronics and Embedded Systems Lab focuses on exploring customised hardware, software and co-design solutions for embedded systems.

Directors: Dr. Muhammad Adeel Pasha, Dr. Muhammad Jahanghir Ikram, Dr. Shahid Masud, Dr. Awais bin Altaf and Dr. Wala Salem Mustafa Sadeh

Energy and Power Systems Lab conducts research on developing models for smart grids and their use in designing a smart power distribution infrastructure for developing countries. Work in progress includes generation through renewable energy sources, integration with grid, power flow control, smart homes and smart metering infrastructure development.

Directors: Dr. Hassan Abbas Khan and Dr. Nauman Ahmad Zaffar



RAMCASP Research Lab conducts research and development in RF/ Microwave domain to develop products in the area of Information, Communication and Sensing, 5G Technology, RF and Mm-wave Antennas and Packaging, Internet of Things, Wearable Wireless Healthcare Devices, Smart Agriculture, Printed Electronics, Smart and Intelligent Textile and Packaging etc.
Director: Dr. Wasif Tanveer

Semiconductor and Nanoelectronic Devices Lab focuses on the device design, physics based modelling, and characterisation in a broad-range of semiconductor and nanoelectronic technologies including MOSFETs, On-Chip Memory Cells, Solar Cells, Biological Sensors, and, Micro-Electromechanical Systems (MEMS).
Director: Dr. Nauman Zafar Butt

Smart Data Systems and Applications Lab works on the development of design principles and prototype implementations of smart solutions targeting the specific applications in a wide variety of areas, such as health, infrastructure, industry, agriculture and transportation.
Directors: Dr. Zubair Khalid, Dr. Muhammad Tahir and Dr. Momin Ayub Uppal



Dr. Jawwad Nasar Chattha | PhD Electrical Engineering 2011

“LUMS stands out as an institution where quality education, as well as research, are the prime focus. Pursuing my PhD at the Electrical Engineering Department has been an immense learning experience and the best decision I ever made. The barriers of conducting cutting edge research and development in Pakistan have been removed by LUMS through its great faculty and well equipped laboratories.”

HOW LUMS SBASSE WILL HELP YOU REALISE YOUR AMBITION

- Offers are received from academia and industry for research and development, design, testing and maintenance, both nationally and internationally.
- Students get direct placements at various local as well as international universities.
- MS and PhD students work alongside faculty members as Teaching Assistants and Research Assistants.
- Graduates are pursued by firms in the fields of Power Generation and Supply, Construction, Transportation Infrastructure Maintenance and Development, Manufacturing, Communications and Media, Computer Hardware and Software Design, Healthcare and Science and Technology Research.

QUICK FACTS

 **Qurat-ul-Ain Nadeem, BS EE 2013 graduate was selected as 2018 Marconi Society Paul Baran Young Scholar.**

 **The initiative of national centres from HEC saw a significant participation from EE faculty. Dr. Muhammad Abubakr, Dr. Zartash Uzmi, and Dr. Hassan Mohy-ud-Din won 3 research labs.**

QUICK FACTS



An MoU between LUMS and the National Highway & Motorway Police will collaborate on research and development of an application system to facilitate road users on national motorways and highways and improve the technology for law enforcement on them, with Dr. Zubair Khalid, Assistant Professor, Electrical Engineering.



4 Electrical Engineering PhD students have graduated this year.

EMBRACE THE SBASSE EXPERIENCE

- 1** SBASSE student, Faaziz 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. MOMIN AYUB UPPAL | Assistant Professor, Department of Electrical Engineering

"The Department of Electrical Engineering offers graduate coursework which is comparable to that of any top-notch university across the globe; both in its breadth as well as its depth. Couple that with the unparalleled quality of its faculty as well as an open and flexible environment conducive to rigorous research, our graduate programmes truly stand out from the pack. There is no other place in Pakistan that I would rather be than at LUMS."

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

<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

<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
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