



کراچی یونیورسٹی

University of Karachi

Department of Mathematics

UNIVERSITY OF KARACHI

University of Karachi, largest in the country in terms of student enrolment and number of PhD's produced, is located in the heart of Karachi, the financial and the business center of Pakistan. The University offers baccalaureate to doctoral and post-doctoral programs in a wide range of subjects. With prestigious institutions like, the HEJ Research Institute of Chemistry and the Applied Economic Research Center, University of Karachi is rated as the best public-sector university in the country. With a campus spanning over 1200 acres the university offers a breathtaking view and pollution-free environment if one wants to get away from smog of the city.

DEPARTMENT OF MATHEMATICS

Department of Mathematics was established in 1956. Prof. Dr. Suleman Kerawala was the Founder Chairman. Prof. Dr. S. M. Yahya introduced course reforms. Prof. Dr. Syed Arif Kamal, who completed his full 3-year term on September 16, 2006, revived 3 seminar series, and initiated 2 new seminar series. Prof. Dr. Sarwar Jahan Abbasi has taken charge as head of the department 2 years ago. She is the first lady professor to chair Department of Mathematics. She has introduced new courses in mathematics, including compulsory courses in biomathematics for BS, final year students. Below is a little overview of the department:

PROGRAMS OFFERED

- | | |
|--------------------------|-------------------------------|
| a) Post-Doctoral Program | f) BS |
| b) DSc | g) BSc (Hons) |
| c) PhD | h) Diploma in Mathematics |
| d) MS | i) Certificate in Mathematics |
| e) MA/MSc | j) Certificate in IT |

In addition to these core programs, our department caters to the subsidiary courses in BS (Mathematics) offered in 14 combinations in Sciences and all combinations in Arts. Our department, also, renders services of its full-time faculty to teach mathematics courses in other programs and departments as well as government organizations.

Aims and Objectives

- To inculcate habits of creative thinking, critical analysis and rigorousness, so that the students start enjoying mathematics
- To make the student appreciate the uniqueness of mathematics as tool of the tools, having the power of generalization and the power of application
- To develop ability in students to formulate a problem using the language of mathematics
- To equip students with the tools required and the mathematical techniques applied in the industrial, the business, the financial and the health-care organizations
- To propose mathematical solutions to indigenous problems arising in the industrial, the business, the financial and the health-care sectors
- To strengthen academia-professional-world bonding by tailoring the courses and the trainings offered according to needs of the end-user

Description of Programs

In the modern era of knowledge-based economy, it is absolutely necessary for a nation to uplift its standards of teaching, research and practice in science, technology and engineering. Mathematics is one of the critical pillars, upon which the entire structure of scientific knowledge is established. Hence, a strong

foundation for our graduates in mathematics is a pre-requisite for efficient progress in other quantitative and highly technical fields.

The undergraduate program has a blend of courses of both pure and applied nature. In the pure mathematics part of studies the students acquire knowledge in theories, which constitute the scientific foundation of development, systematization and justification of mathematical discipline in the investigation of real-life problems. This part is general enough to cope with future trends of mathematics.

The graduate program aims to expose students to latest research in mathematical sciences through a series of courses, seminars and involvement in on-going research activities. MS students write thesis based on original research based on problems formulated with the guidance of their research supervisors. They are expected to publish at least one research paper from their MS thesis. Those, who show more independence and ability to think out-of-the-box [by conceiving a research problem, almost, independently and publishing a research paper on that work combined with excellent scores in MS courses and GRE (Subject) are eligible to apply for conversion to PhD]. One or more papers published with a demonstrated capability to, not only, work independently, but also, achieve excellence in mathematics, may bring them a PhD upon successful writing and defense of a dissertation. All MS thesis and PhD dissertations are put through rigorous scrutiny by internal and external examiners. These documents, are, also, checked by many anti-plagiarism softwares available at the disposal of University of Karachi and HEC (Higher Education Commission).

FACULTY

Highly qualified faculty, with degrees from reputed universities in Canada, UK and USA, teaches courses according to the modern trends, based on problem solving, applications and hands-on training. Many of them are on the list of HEC-Approved-PhD Supervisors.

Our faculty is, actively, involved in teaching, counseling, research, administration, professional development and policy-making. These torchbearers of learning, regularly, produce research papers and act as referees of research journals of international repute, for example, *Clinical Biomechanics (Elsavir)*, *Optics and Laser Technology (Elsavir)* and *Proceedings of the Pakistan Academy of Sciences*. Some have, also, received research-productivity allowance from Pakistan Science Foundation. In addition, our researchers presented papers in *the World Climatic Change Conference, Moscow* (October 2003), *the World Conferences on Mathematics* (March 2004, 2005 and 2006) and *the National Australian Convention of Amateur Astronomers, Hobart, Australia* (April 2004), *the Fourth International Bhurban Conference on Applied Sciences and Technologies* (June 2005), *the Tenth National Aeronautical Conference* (April 2006), *the First National Conference on Headache and Back Pain* (October 2008), *the 35th All Pakistan Science Conference* (December 2008) and *the Thirty-Fourth International Nathiagali Summer College on Physics and Contemporary Needs* (July 2009). Faculty delivered invited papers in *the IEEE International Symposium on Biometrics and Security Technologies* (April 2008), *the International Conference on Physics and the World of Today* (December 2008), *the IEEE INMIC 2008* (December 2008) and *the Fourth Symposium on Computational Complexities, Innovations and Solutions* (May 2009) and *Conference on General Relativity and Gravitation* (February 2010). Professors from this department, also, chaired sessions in international conferences and were panelists in panel discussions. A senior professor of the department delivered 'Keynote Lecture' in *the Sindh Educational Conference* (January 2009), 'Prof. Dr. Muhammed Rafi and Prof. Dr. Muhammed Razi Hussain Memorial Lecture' during *the National Conference on Physics and the World of Today* (December 2009), 'Prof. Dr. Khursheed Alam Khan Memorial Lecture' during *the Conference on General Relativity and Gravitation* (February 2010), 'Prof. Dr. Q. K. Ghori Memorial Lecture' during *the Fifth Symposium on Computational Complexities, Innovations and Solutions* (May 2010), 'the Salim Ahmed Memorial Lecture' during *the Pakistan Institute of Physics Conference* (March 2011) and 'the Islamuddin Memorial lecture' during *the Sixth Symposium on Computational Complexities, Innovations and Solutions* (May 2011). On March 22, 2010, the department organized *the First National Conference on Mathematical Sciences*, as part of the Golden Jubilee Celebrations. The program included popular lectures and papers representing latest trends in mathematics as well as mathematical-environment session (recall of memories, and mathematical art competition). To honor our deceased member of Board of Studies, 'the Syed Firdous Memorial Lecture' was delivered by Prof. Dr. Syed Arif Kamal, in which Mathematical Biology Group of this University had the honor to step ahead of the world in introducing the next level of accuracy in the measurement of man. A new branch of mathematics was introduced in this lecture, named as 'anthromathematics' (mathematics of measurement of man).

Faculty members of this department are, currently, holding the posts of Pro-Vice Chancellor, Controller of Examinations, Convener, National Curriculum Revision Committee for Mathematics, HEC, Convener, Subject Committee for Mathematics, National Testing Service and Project Director of the NGDS Pilot Project. Other distinctions of our faculty members include being the Founding Director of the Institute of Space and Planetary Astrophysics and working as Acting Dean, Faculty of Science. Our department was, also, represented in Syndicate and Board of Advanced Studies and Research (BASR). Professors from the department served/currently serving on Committee to Investigate Plagiarism, Testing-Services Committee, PhD-Courses Committee and Committee to Evaluate Research Proposals, Expert Panel on Curriculum of Mathematics, National Curriculum Council, Ministry of Education, Government of Pakistan as well as the Education Committee, Transparency International Pakistan.

Permanent-Faculty Listing

Professors

Dr. Rana Khalid Naeem	Dr. Syed Arif Kamal	Dr. Sarwar Jahan Abbasi ^a
Dr. Syed Anwar Ali Zaidi		

Assistant Professors

Mrs. Rehana Shakeel	Mrs. Naveeda Qamar	Mrs. Akhtar Jehan Aziz
Dr. Muhammed Shahid Qureshi ^b	Mr. Mushtaq Ahmed	Dr. Muhammed Jawed Iqbal
Mr. Muhammed Javed Ansari ^c	Mr. Waseem Ahmed Khan	Mrs. Syeda Sadia Zia

Lecturers

Mr. Waseem Ahmed Ansari	Mr. Khurram Kamran ^d	Mrs. Saba Naz
Mr. Muhammed Imtiaz	Mr. Syed Inayatullah	Mr. Najeeb Alam Khan
Mr. Tanveer Ahmed Siddiqi	Mr. Asif Raza Khan ^d	

^a chairwoman

^d on study leave

^b on foreign-service leave

^c controller of examinations

NON-TEACHING STAFF

The Department cannot function for a single day, without the dedicated efforts of our non-teaching staff, performing multiple tasks with efficiency and effectiveness.

Non-Teaching-Staff Listing

Javed Saeed	Shamim Muhammed Khan	Shabbir Ahmed
Arif Ali	Shab-é-Noor	Muhammed Aslam
Muhammed Hamza	Muhammed Zeeshan	Sadaqat Ali
Allah Rakha Masih	Sadiq Masih	

RESEARCH

A Nobel laureate was asked, "What is the key to your success?" He replied, "I know what I am doing, in depth, and know a little bit about other disciplines". This strategy of complete knowledge of the problem at hand and knowledge of the associated fields is being applied to bring out efficient, elegant and innovative solutions to problems challenging the mankind in the third millennium, using the techniques of mathematics. Modeling of system, environment and sources of error is done using mathematical tools, fine-tuning to be done through simulations and test runs, followed by validation through field trials. Faculty is engaged in research in the following areas:

- 3-D Optical Imaging and Image Processing
- Algebra
- Anthromathetics
- Astrodynamics and Space Flight Dynamics
- Biomathematics
- Climate Mathematics
- Controls and Simulation
- Fluid Dynamics
- Mathematical Physics
- Mathematics in International Relations
- Operational Research
- Pedagogical Techniques in Mathematics
- Relativity and Gravitation
- Security Technologies

Our department was the first to have PhD courses (800 series) approved. These courses were offered for the first time in 2009. Other specialized MS courses offered are Anthromathematics I-II and Astroynamics I-II.

STUDENT HONORS

Many students of our department have topped the list of candidates in the entire university. In fact, our department has a number of positions in the Dean's merit list every year. Most recently, Presidential Award "Izaz-é-Sabqat" was awarded to our students, Mehwish Mughal and Ambreen Kanwal.

SEMINARS

The Research-Seminar Series exposes students to current trends in mathematics and handling industrial projects. The Students'-Seminar Series trains them in presentation skills, job-searching skills and interviewing skills. Starting this year, we have introduced First-Year Seminar, specifically tailored to the entering students, who have passed their HSC examination. The topics of MPhil/PhD-Seminar Series include research-proposal writing, publishing in peer-reviewed journals, *etc.* Goal setting and time management are some of the topics covered in the Professional-Skills Seminars Series.

During August 2004, Six-Day-In-Service Mathematics Training Course for college teachers was arranged by our department in collaboration with HEC Regional Center, Karachi. On September 30, 2010, there was a motivational lecture by eminent scientist of Pakistan, Prof. Dr. Muhammed Iqbal Chaudhry, Director, HEJ Research Institute of Chemistry on the state of science education and research in the Muslim world.

INTERNATIONAL LINKAGE

Professors from Norwegian University of Science and Technology and King Abdul Aziz University (Saudi Arabia) as well as US scientists gave seminars in the department. The department is trying to establish liaisons with western universities. On October 28, 2008 a team from French Embassy in Islamabad visited our department and discussed possible projects for collaboration. Previously, Swedish team visited our department. Russian Consul General has, also, expressed interest in some of our programs.

PROFESSIONAL EXPOSURE

Department of Mathematics has established liaisons with multinationals and government organizations, *e. g.*, Engro Asahi Chemicals and Polymers (Ltd.), the Aga Khan Foundation, Pakistan Space and Upper Atmosphere Research Commission (SUPARCO), Data Communications and Controls, *etc.* The multinationals offer specialized training, internships and, eventually, jobs to our graduating students.

COMMUNITY OUTREACH

As part of its Community-Outreach Program, our department has been offering the Early Talent Research Participation Program (ETRPP) and internships to pre-university students since 2002. Departmental faculty, also, gave lectures to students enrolled in Talent-Farming Scheme of HEC in 2004.

CONTACT PERSONS

Chairwoman

PROFESSOR DR. SARWAR JAHAN ABBASI
(November 25, 2009 [†]–)
Telephone: (92 21) 9926 1300-6 ext. 2293

Administrative Assistants

Javed Saeed
Shabbir Ahmed
Telephone: (92 21) 9926 1300-6 ext. 2293

Ex-Chairmen

Professor Dr. Syed Arif Kamal
(September 16, 2003 [†]– September 16, 2006 [@])
Telephone: (92 21) 9926 1300-6 ext. 2380
e-mail: kamal(at the rate of)ngds-ku.org
Homepage: <http://ngds-ku.org/kamal>

Professor Dr. Rana Khalid Naeem
(September 16, 2006 [†]– November 25, 2009 [@])
Telephone: (92 21) 9926 1300-6 ext. 2379
[†] Afternoon
[@] Forenoon

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Web address of this document: <http://www.ngds-ku.org/math/math.pdf>