MATHEMATICS & STATISTICS

The Department, which started as the Department of Mathematics in 1960, got its new name as the Department of Mathematics and Statistics in 2004. It has always shared the vision of the Institute in striving for excellence in research and teaching and has succeeded in this endeavour to a large extent. Over the years, the department has evolved as one of the premier departments in the country providing excellent teaching and research in Mathematical Sciences and Statistics. The vibrant academic environment is nurtured by strongly motivated faculty and provides an opportunity to pursue research in frontline areas of basic as well as interdisciplinary areas of science and technology. The Department currently has 39 faculty members who are engaged in research and teaching in various areas of Pure Mathematics, Applied Mathematics and Statistics. The faculty members of the Department aim to achieve high quality research and teaching standards in various disciplines of Mathematics and Statistics with a flavor of unified approach towards both pure and applied aspects and are ever responsive towards the growing demands of new and emerging areas of research and teaching. As Mathematics and Statistics have penetrated into many areas of human endeavours, an updating of the curricula is regularly undertaken to keep abreast with the latest developments and to bring innovations. The contributions by the faculty members of the Department in research and teaching have won recognition by the scientific community in the form of various prestigious awards and distinctions. A number of sponsored research projects funded by national and international agencies are also undertaken by them.

FACILITIES

The Computer Centre of the Institute provides E-mail, Web, DNS, FTP, internet access, high performance computing and other services for 24 hours and 365 days a year. Computer Centre has a number of state of the art servers, high end Linux and Windows labs and application software. The state of the art parallel and multi-processor computer servers cater to the computational needs of the academic community. In addition, the Department also has its own high-end Linux Lab with 48 desktop computers and Windows Lab with 34 desktop computers that provide computing and remote access facilities exclusively to the departmental students. All PCs have advanced configurations (Core i7 and Core 2 Quad processors) and some latest and advanced software. Apart from this, the

Department has one Parallel Computing Laboratory and an Advanced Digital Imaging Solution (ADIS) Laboratory.

IIT Kanpur has a large Central Library named after late Professor P.K. Kelkar, the founding director of the Institute. This library is one of the best libraries of its kind in India with an excellent collection of books and periodicals. There is a generous allocation from the Institute towards library funding for Mathematics and Statistics. The library is fully automated and provides CD-Rom computer-aided referral services. In addition, the Central Library has the special status of being an NBHM (National Board of Higher Mathematics) Regional Library, thereby looking after the needs of mathematicians in the geographic region. Towards this, NBHM has been providing us with a sizeable annual grant. The Department maintains its own library with a good collection of text books and reference books. It is run by the Ph.D. students of the Department. The Department provides B/W Laser printing facility to all PhD students for their research use and to all UG and other PG students on request basis. The departmental seminar room is well-equipped with Top-mounted, Handnote and OHP projectors, cordless Microphone and other Audio-Visual support. The Department has three separate labs only for our research scholars. Every research scholar has his own cabin with advanced Core i7 computer.

Ph.D. PROGRAMMES

In addition to a five-year integrated M. Sc. Program in Mathematics & Scientific Computing (from the academic session 2011-12, the five-year M.Sc. (Integrated) programme in Mathematics and Scientific Computing has been replaced by a more flexible four-year BS programme in Mathematics and Scientific Computing) and two parallel two-year M.Sc. programs in Mathematics and in Statistics, the Department also offers two parallel Ph.D. programs in Mathematics and in Statistics.

The eligibility criteria for admission to these Ph.D. programs are:
An applicant must have a Master's degree in the relevant subject (or, a related area) with a minimum of 55 percent marks/5.5 CPI (or, CGPA) out of a scale of 10; or a Bachelor's degree in Engineering or Science (4 year program) with a minimum of 75 percent marks/7.5 CPI (or, CGPA) out of a scale of 10. Further, a valid GATE/ UGC/ CSIR score in MA/MS paper or INSPIRE/ NBHM fellowship is also required except for graduates from

IITs with a minimum CPI / CGPA of 8.0. The final selections are done through a written test and interview. These are conducted twice a year - in May, for admission to the Fall Semester starting from July and in December, for admission to the Spring Semester starting from end-December. Advertisements are normally posted approximately before two months prior to the admission tests.

The programs attract good students from all over India. Research work leading to the Ph.D. degree in Mathematics / Statistics is carried out in various areas indicated under faculty specialization. In the first two semesters, every Ph.D. student is required to do at least six courses. These courses are intended to familiarize the students with the modern aspects of Mathematics / Statistics and initiate the students to the chosen area of research. Apart from training related to the fundamental principles of Mathematics and Statistics, the scope of these comprehensive and flexible programs include interaction with allied areas from other departments of the Institute. Such an interaction, while maintaining the identity of the Department, is unique to the curricula. The doctoral programs aim to prepare motivated researchers in frontline areas. The department has so far produced over 300 Ph.D. students who are now associated with reputed educational institutes and R&D organizations across the globe. Many of our Ph.D. students are also doing extremely well in private sector industries. Currently the department has about 50 research scholars working in state of the art research areas. Regular seminars keep everyone charged and updated. Ph.D. students are required to actively participate in the tutoring of U.G. students (from B. Tech, B. Tech - M. Tech Dual, M. Sc. Integrated, four-year BS and two-year M. Sc. programs) in core and professional courses. They also conduct voluntary helping sessions for the benefit of the U.G. students. This helps them in tuning their communication and teaching skills.

MEMBERS OF FACULTY AND THEIR AREA OF RESEARCH SPECIALIZATION

Akash Anand, Ph.D. (Univ. of Minnesota, Twin Cities) : Numerical analysis, Scientific computing, Partial differential and integral equations.

D. Bahuguna, Ph.D. (IIT/K): Differential Equations, Non-linear Analysis, Theory of Semi-groups.

Malay Banerjee, Ph.D. (Calcutta Univ): Mathematical Ecology and Eco-Epidemiology, Stochastic Stability Analysis and Chaos in Related Areas, Nonlinear Dynamics.

Mohua Banerjee, Ph.D. (Calcutta Univ): Mathematical Logic and Rough Set Theory.

Peeyush Chandra, Ph.D. (IIT/K): Mathematical Modeling, Fluid Mechanics, lubrication, Biomechanics.

Sameer Chavan, Ph.D. (Pune Univ): Operator Theory, Subnormals and Operators Close to Isometrics.

Aparna Dar, Ph.D. (SUNY Stonybrook): Differential Geometry, Algebraic Topology, Knot Theory.

Subhra Sankar Dhar, Ph.D. (ISI Kolkata): Non-parametric and robust statistical methods, Cluster analysis and likelihood based inference

I. D. Dhariyal, Ph.D. (Ohio State): Estimation, Ranking and Selection Procedures

Pravir K. Dutt, Ph.D. (UC Los Angeles): Numerical Analysis, Fluid Mechanics

Joydeep Dutta, Ph.D. (IIT/Kgp): Non-smooth Optimization/Abstract Convexity and Global Optimization.

Sudipta Dutta, Ph.D. (ISI Kolkata): Functional Analysis.

S. Ghorai, Ph.D. (Univ. of Leeds): Computational Fluid Dynamics, Mathematical Biology, Adaptive Unstructured grid.

Manjul Gupta, Ph.D. (IIT/K): Functional Analysis, Operator Theory.

M. K. Kadalbajoo, Ph.D. (IIT/B): Numerical Analysis.

G. P. Kapoor, Ph.D. (IIT/K): Convex Analytic Dynamics and Fractals, Computational Complex Analysis.

B. V. Rathish Kumar, Ph.D. (Sri Sathya Sai Instt.): Computational Fluid Dynamics, Finite Element Analysis, Parallel Numerical Algorithms.

Debasis Kundu, Ph.D. (Penn State Univ): Statistical Signal Processing, Non-linear Regression, Survival Analysis, Statistical Computing.

Arbind Kumar Lal, Ph.D. (ISI Delhi): Coding Theory.

Shobha Madan, Ph.D. (IIT/K): Harmonic Analysis, Hp-Spaces, Wavelets.

Alok Kumar Maloo, Ph.D. (Bombay Univ./TIFR): Commutative Algebra.

Ashis Mandal, Ph.D. (ISI Kolkata): Algebraic Topology; Deformation of Algebraic Structures, Higher Structures and Related Fields.

Neeraj Misra Ph.D. (IIT/K): Statistical Inference, Reliability Theory, Ranking & Selection Problems, Nonparametric Entropy Estimation.

Amit Mitra, Ph.D. (IIT/K): Statistical Signal Processing, Robust Model Selection & Parameter Estimation, Data Mining in Finance.

Sharmishtha Mitra, Ph.D. (IIT/K): Order Statistics, Reliability Models, Robust Estimation in Non-linear Models, Econometrics.

Parasar Mohanty, Ph.D. (IIT/K): Harmonic Analysis.

T. Muthukumar, Ph. D. (IISc, B'lore): Homogenization and variational methods for PDE's, Elliptic PDE's, Optimal Controls.

Nandini Nilakantan, Ph.D. (IISc B'lore): Combinatorial Theory, Computational Geometry.

Abhijit Pal, Ph.D. (ISI Kolkata): Geometric Group Theory, Relatively Hyperbolic Groups, Mapping Class Groups.

Sasmita Patnaik, Ph.D. (Univ. of Cincinnati): Operator Theory

S. K. Pattanayak, Ph.D. (CMI): Algebraic Groups and Invariant Theory, Lie Algebras and Representation Theory.

Sanjoy Pusti, Ph.D. (ISI Kolkata): Harmonic Analysis on Lie Groups.

R. K. S. Rathore, Ph.D. (IIT/D; DSc (Delft)) : Approximation Theory, Numerical Analysis, Computer Aided Tomography.

Rama Rawat, Ph.D. (ISI B'lore): Harmonic Analysis.

G. Santhanam, Ph.D. (IITB/TIFR): Differential Geometry.

Debashis Sen, Ph.D. (ISI Kolkata): Homotopy theory, Group actions.
Shalabh, Ph.D. (Lucknow Univ): Econometrics, Regression Modelling, Statistical Inference, Sample Surveys.

P. Shunmugaraj, Ph.D. (IIT/B): Functional Analysis, Approximation and Optimization.

Prawal Sinha, Ph.D. (IIT/B): Lubrication Theory, Biomechanics, Environmental Pollution, Epidemiology.

For any information related to admission to the Ph. D. programmes, please mail to:

Sharmishtha Mitra (smitra@iitk.ac.in)
DPGC Convener
Department of Mathematics & Statistics
IIT Kanpur.