

INDIAN STATISTICAL INSTITUTE



**PROSPECTUS
2016-17**



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INTRODUCTION

The Indian Statistical Institute, known widely as ISI, was founded in 1931 by Professor Prasanta Chandra Mahalanobis. Growing out of a small Statistical Laboratory set up by Professor Mahalanobis in the Presidency College in Kolkata, the Institute soon moved into its present campus at Baranagar on the northern outskirts of Kolkata. Ever since that humble beginning, over the past eight decades, the Institute has undergone phenomenal growth and is now widely regarded as one of the leading institutions in the world as a centre for research and training in Statistics & related sciences.

In recognition of the importance of the Institute in the development and application of Statistics, the Parliament of India, in 1959, enacted the Indian Statistical Institute Act, declaring it an Institution of National Importance and empowering it to grant degrees & diplomas in Statistics. In 1995, this Act was further amended, empowering the Institute to grant degrees & diplomas also in Mathematics, Quantitative Economics, Computer Science & other subjects related to Statistics as may be determined by the Institute from time to time.

The headquarters of the Institute is located in Kolkata. However, centres of the Institute have come up over the years in other major cities. At present, the Institute has four centres operating at Delhi, Bengaluru, Chennai and Tezpur. In addition, the Institute has a branch at Giridih devoted to agricultural and sociological research and also a network of units at Coimbatore, Hyderabad, Mumbai and Pune, involved in activities related to Statistical Quality Control & Operations Research.

Most of the research & teaching activities of the Institute take place in its headquarters in Kolkata and the four centres. In Kolkata, Delhi, Bengaluru and Hyderabad, the Institute has its own campus and they are equipped with adequate hostel facility for students, residential quarters for the faculty and guest houses, and also recreational and medical facilities. The campus at Giridih has a small guest house and rudimentary hostel facilities. The relatively new centres at Chennai and Tezpur are still operating at temporary locations. However, at these centres too, the Institute is providing hostel facility for students and residential facility for faculty members. At each of these five locations, there are a large number of scientists in Theoretical & Applied Statistics, Mathematics and Economics. In Kolkata, Chennai and Bengaluru, there is also a large group of scientists in Computer & Communication Sciences, Statistical Quality Control & Operations Research and other branches of natural and social sciences.

A sizeable proportion of the students passing out of the Institute go on to build remarkably successful careers in research and academics. Some of the most eminent and leading researchers and academics in the fields of Statistics, Mathematics, Computer Science and Economics are alumni of the Institute. At the same time, students of the Institute who have gone into industry have also been extremely successful. A number of top and well-accomplished leaders in industry are also alumni of the Institute.

For many years now, the Institute has been running a very proactive on-campus placement programme. Under the supervision of a member of the teaching faculty, this programme has been very successful in providing the aspiring students, in the final years of their respective programmes, excellent placement opportunities in some of the leading organisations in various sectors of the industry. Some of the companies that have visited the Institute's campus in Kolkata for recruitment in the past few years are:

AIG, AMAZON, AMD, AMERICAN EXPRESS, ANZ BANK, AXIS BANK, BARCLAYS SHARED SERVICES, CAPITAL ONE, CITIBANK, CREDIT SUISSE, CRISIL, DELOITTE, ERNST & YOUNG, FICO, GOLDMAN SACHS, GOOGLE, HP, HSBC TECHNOLOGY & SERVICES, IBM RESEARCH LAB, ICICI BANK, ICICI LOMBARD, JP MORGAN, MCKINSEY & COMPANY, MICROSOFT, NIELSEN, RBS, SAP, SYNOPSIS, TCS INNOVATION LABS, TRDDC, VIACOM18, WALMART LABS, XEROX RESEARCH ETC.

Over the last several years, the Institute has been very actively pursuing institution-level collaboration that has led to Memoranda of Understanding (MOUs) with a number of universities/academic institutions as well as industrial organisations. These MOUs range from collaborative research to research grants for students/faculty as well as student/faculty exchange programmes. At present, the Institute has MOUs signed with, among others, the following institutions/organisations:

BANGLADESH INSTITUTE OF DEVELOPMENT STUDIES, BIRSA AGRICULTURAL UNIVERSITY, CHENNAI MATHEMATICAL INSTITUTE (CMI), DE BEERS INDIA PVT. LTD., DST-INDO GERMAN MAX-PLANCK CENTRE, ECOLE POLYTECHNIQUE MASSTRO, FICO, HOMI BHABHA NATIONAL INSTITUTE, IBM INDIA PVT. LTD., IISCO (STEEL AUTHORITY OF INDIA LTD.), INDIAN INSTITUTE OF TECHNOLOGY MADRAS, INFOSYS LIMITED, INSTITUTE OF FINANCIAL MANAGEMENT RESEARCH (IFMR), INTERNATIONAL GROWTH CENTRE, LONDON SCHOOL OF ECONOMICS (LSE), MAASTRICHT UNIVERSITY-NETHERLANDS (JOINT PHD PROGRAMME), NATIONAL UNIVERSITY OF SINGAPORE, NORTH CAROLINA STATE UNIVERSITY, SETS, TATA CONSULTANCY SERVICES LTD (TCS), TATA INSTITUTE OF FUNDAMENTAL RESEARCH (TIFR), TATA INSTITUTE OF SOCIAL SCIENCES, MUMBAI, TECH MAHINDRA,

TECNOLOGICO AUTONOMO DE MEXICO (ITAM), TEOCO, TEXAS INSTRUMENTS PVT. LTD., THE WARWICK UNIVERSITY.

The Central Library of the Institute, located at Kolkata (with a network extending to two major libraries at Delhi and Bengaluru Centres and other locations of the Institute), has one of the richest collections in the country, particularly in the fields of Statistics and allied disciplines, namely, Mathematics, Economics, Computer Science, Earth Science, Life Science, Physics, Quality Control, etc. In addition to a total volume of more than three lakhs, comprising books, bound journals, official reports/data-books, dissertations and theses, reprints, non-print materials such as CDs/floppies, microfilms and microfiches, it maintains online access to journals and all the major scientific publication databases. It has also a separate NBHM collection funded by National Board for Higher Mathematics, Department of Atomic Energy, Government of India. It is making endeavours to create institutional repositories using open-source software, facilitating access to indigenous resources across regions and increasing the visibility of such resources. As a part of the Central Library, the renovated *Amrapali* building which was the residence of the founder of the Institute, now houses the **P C Mahalanobis Memorial Museum & Archives**.

The Institute also runs the International Statistical Education Centre (ISEC), established in 1950, under the auspices of the Government of India. This Centre has been providing training in Statistics to sponsored students mainly from the developing countries of the Middle-East, South & South East Asia and the Far East and from the Commonwealth countries of Africa. The Centre also offers various short-term courses in Statistics & related subjects.

A BRIEF HISTORY OF THE INSTITUTE

The Indian Statistical Institute had its beginning in a small statistical laboratory set up by Professor Prasanta Chandra Mahalanobis in the Presidency College at Kolkata, where he was then a professor of Physics. In a meeting held on 17th December 1931 and presided over by Sir R N Mookerjee, the first President of the Institute, the Indian Statistical Institute (ISI) was formally established and Prasanta Chandra Mahalanobis was appointed the Honorary Secretary. The Institute was registered on 28th April, 1932, as a non-government and non-profit learned society under the Societies' Registration Act No. XXI of 1860. The Institute is now registered under the West Bengal Societies Registration Act XXVI of 1961, amended in 1964. The major objectives of the Institute, as stated in its Memorandum of Association, are:

- (i) to promote the study and dissemination of knowledge of Statistics, to develop statistical theory and methods, and their use in research and practical applications generally, with special reference to problems of planning for national development and social welfare;
- (ii) to undertake research in various fields of natural and social sciences with a view to the mutual development of Statistics and these sciences;
- (iii) to provide for, and undertake, the collection of information, investigations, projects, and operational research for purposes of planning and the improvement of efficiency of management and production.

With its humble start in a laboratory in the Presidency College, the Institute soon embarked upon a remarkable journey with enduring support from a number of distinguished personalities and devoted scholars in Kolkata. In the first two decades of its existence, which was a glorious chapter in the annals of Indian science and institution building, the ISI undertook a series of pioneering programmes involving application of Statistics in search of solutions to some of the urgent and live problems of the country. Such programmes included innovative projects on sample surveys of yield and land utilisation of crops, socio-economic after-effects of Bengal famine (1943-44) and problems of flood research, to name a few. Simultaneously, led by Professor Mahalanobis, path-breaking theoretical research was carried out by a very able group of young statisticians including R C Bose, S N Roy & C R Rao. These innovations and methodological research have since become classics in Statistics. All these activities brought laurels for the Institute in India as well as abroad.

Over a period of several decades since its inception, the Institute made steady strides to establish its identity as a pioneering organisation nationally as well as internationally. Some of the principal achievements of this period include

- (i) the establishment of a full-fledged research & training school in Statistics and Probability with applications in natural & social sciences,
- (ii) the publication of *Sankhyā*, the first international journal of Statistics in India,
- (iii) the inception of a National Sample Survey wing, engaging in comprehensive socio-economic data collection for the nation,
- (iv) the creation of a string of Statistical Quality Control units for promoting the quality movement at various industrial centres in the country, and
- (v) collaboration with the International Statistical Institute to train Government statisticians from Asia and Africa.

One of the most significant contributions of the institute in India's nation-building came when, in 1954, Pandit Jawaharlal Nehru, the then Prime Minister of India, entrusted Professor Mahalanobis and ISI with the responsibility of preparing the draft Second Five-Year Plan for the country. The institute established a planning wing dedicated to the formulation of the Second Five-Year Plan of India. The draft submitted by Prasanta Chandra Mahalanobis and the planning models formulated by him and his colleagues have since been regarded as major contributions to economic planning in India.

As another remarkable achievement, the Institute, in 1956, installed the first electronic computer in the country. In 1961, the ISI, in collaboration with Jadavpur University, undertook the design, development and fabrication of a fully transistorised digital computer, called ISI-JU-1, which was commissioned in 1966. The institute had established an Electronic Computer Laboratory that was responsible for developing

- (a) the first mechanical hand computing machine,
- (b) the first Analog computer,
- (c) the first Punched Card storing machine, and
- (d) the first Solid State Computer in India.

The Institute, from its formative period till the recent time, received as guests many eminent scientists, including Nobel Laureates. Besides Sir Ronald A Fisher, JBS Haldane and Walter A Shewhart, the luminaries included Frederic & Irene Curie, Neils Bohr, AN Kolmogorov, PMS Blackett, JD Bernal, Joan Robinson and Genechi Taguchi. In recent times, the visit of Amartya K Sen, Robert Aumann, Lotfi A Zadeh, Joseph E Stiglitz, Sir Roger Penrose, Sir Michael V Berry, Sir James A Mirrlees, Eric S Maskin, Ei-Ichi Negishi and SRS Varadhan, the 2007 Abel Prize winner for his contributions to probability theory & an alumnus of the institute, may be especially mentioned.

The Institute has always had its headquarters in Kolkata since its inception. Later, the Delhi Centre, initially housed within the Planning Commission premises, was started in 1974, and shifted to its present campus in 1975. The Bengaluru Centre was conceived by Professor P C Mahalanobis during 1960s. With the Statistical Quality Control unit functioning in Bengaluru from 1956, and Documentation Research & Training Centre from 1962, Professor Mahalanobis thought of starting a centre of ISI around the mid-1960s. However, the process got delayed after Professor Mahalanobis' death in 1972 and the activities of the Bengaluru Centre started in September 1978 in a rented building under the Directorship of Professor G Kallianpur. The Bengaluru Centre was formally declared as a centre of ISI in September 1996. The newly created Chennai Centre of the Institute, which came into being on 26th July, 2008, and the North-East Centre at Tezpur, Assam, which was inaugurated on 23rd July, 2011, are expected to carry out research in theory & applications of Statistics in the new areas of natural & social sciences. The NE Centre is also committed to cater to the statistical needs of the North-Eastern states, including training statistical personnel.

The formal empowerment of the Institute for awarding of degrees came in December 1959, when Pandit Jawaharlal Nehru piloted in the Parliament the enactment of the Indian Statistical Institute Act of 1959, which designated ISI as an **Institution of National Importance**. Its activities steadily grew, existing interests became more broad-based and a number of science units were created in the interest of live interaction between Statistics and natural & social sciences. Empowered by the Act to award degrees, the Institute introduced the Bachelor of Statistics (Honours) & Master of Statistics courses in 1960 under the guidance of Professor Mahalanobis and stalwarts like JBS Haldane and Satyendra Nath Bose who was the President of the Institute for a long period of time, with the philosophy that the academic training of a statistician should encompass the basic principles of Statistics along with its theoretical & methodological development, not merely in abstract formulation, but also in relation to concrete problems arising from natural & social sciences. The Institute also introduced research programmes leading to the Ph D degree from the Institute. After the subsequent amendment of the Indian Statistical Institute Act in 1995, broadening its scope of degree-awarding, the institute introduced other degree programmes, namely, Master of Science (Quantitative Economics) (in 1996-97), Bachelor of Mathematics (Honours) (in 2000-01), Master of Mathematics (in 2003-04).

A one-year Diploma in Computer Science was started in the Institute in 1966. This was upgraded to a two-year Diploma in 1978, which evolved into the current

M Tech programme in Computer Science in 1981, the first such programme in the country.

The Institute initiated the use of Statistical Quality Control & Operations Research in India in the early fifties and started developing these fields through theoretical & applied research, practical training in industry and consultancy assignments. To meet the growing needs from the industry, the institute offered a PG Diploma course in SQC & OR and also offered SQC & OR (later ISOR) as a specialization in the M Stat programme. The increased awareness since late eighties, that SQC & OR techniques are of immense help in the development of the industrial sector, has led to the introduction of a two-year full-time M Tech programme in Quality, Reliability & Operations Research in Kolkata in 1989.

The Institute has also been offering a course leading to Associateship in Documentation & Information Science at the Bengaluru Centre since 1965-66. This course has been upgraded to a Master's level programme, called the Master of Science in Library & Information Science [MS (LIS)] since 2008-09.

In recent years, several new programmes have been introduced:

- a two-year Master of Science programme in Quality Management Science [MS (QMS)] (in 2014-15) which is being conducted in Bengaluru and Hyderabad,
- a one-year postgraduate diploma programme in Computer Applications [PGDCA] (in 2014-15) at the Giridih branch of the Institute, and
- a much-awaited two-year postgraduate diploma programme in Business Analytics [PGDBA] (in 2015-16) at Kolkata jointly with Indian Institute of Management Calcutta and Indian Institute of Technology Kharagpur.

CURRENT ACADEMIC PROGRAMMES

	PROGRAMME	DURATION	VENUE FOR 2016-17
Degree Programmes	B Stat (Hons)	3 years	Kolkata
	B Math (Hons)	3 years	Bengaluru
	M Stat	2 years	Delhi & Chennai
	M Math	2 years	Kolkata
	MS (QE)	2 years	Kolkata & Delhi
	MS (LIS)	2 years	Bengaluru
	MS (QMS)	2 years	Bengaluru - Hyderabad
	M Tech (CS)	2 years	Kolkata
	M Tech (QROR)	2 years	Kolkata
Diploma/Certificate	Part-time Course in SQC*	6 months	Bengaluru, Hyderabad
	Postgraduate Diploma in Statistical Methods & Analytics	1 year	Tezpur
	Postgraduate Diploma in Computer Applications	1 year	Giridih
	Postgraduate Diploma in Business Analytics (jointly with IIT Kharagpur & IIM Calcutta)	2 year	Kolkata
Fellowship	Junior/Senior Research Fellowship	upto 6 years	Kolkata Delhi Bengaluru Chennai

The Institute awards Ph D degrees for research in the fields of Statistics, Mathematics, Quantitative Economics, Computer Science, and Quality, Reliability & Operations Research (QR&OR).

* For the academic year 2016-2017, this course will be notified separately, if offered.

ADMISSION PROCEDURE

Admission to the academic programmes of the Indian Statistical Institute is based strictly on the merit of the candidates as judged from their performance in appropriate admission tests and interviews. Their past academic records may also be taken into account for this purpose. The admission tests are held at a number of centres in India. The next section gives details of scope, eligibility criteria and selection procedures for the programmes offered. If at any stage of the selection process it is found that a candidate does not satisfy the eligibility conditions, his/her application will not be processed any further. Eligibility requirements may be relaxed in some cases at the discretion of the Institute.

If a student is asked to discontinue a programme for having failed or on any disciplinary ground, he/she is not eligible for readmission to the same programme.

For some programmes, there is a provision for employers to sponsor suitable candidates employed by them. Details of this scheme are given separately under the appropriate programmes.

The decision of the Institute in all admission-related matters is final. Canvassing in any form disqualifies a candidate from being selected. The names of candidates called for interview on the basis of the written tests and also of those selected after interview are generally posted on the internet at <http://www.isical.ac.in/~admission>.

Note: Sample questions & syllabi for the Admission tests for the various programmes being offered by ISI in the current year can be downloaded from the ISI admission portal <http://www.isical.ac.in/~admission>.

RESERVATION

For admission to all its programmes (except the Research Fellowships), the Institute follows a policy consistent with the national policy on reservation for candidates from the Scheduled Caste (SC), Scheduled Tribe (ST), Other Backward Classes (OBC) and Physically Challenged (PC) categories (referred collectively as reserved categories). The candidates of these reserved categories also enjoy other benefits detailed below.

Admission	At each stage of the admission process, the list of candidates selected for the next stage has appropriate proportional representation as per Government of India rules, subject to their receiving the minimum qualifying score. The qualifying standard is relaxed for the reserved categories.
Charges	Persons of the reserved categories get concession on all institutional charges, including price of prospectus, seat rent at hostels, library deposit, etc.
Stipend	Meritorious students of the reserved categories get stipend subject to their maintaining adequate level of academic performance.
Hostel	Students of the PC category are assured of accommodation in the hostel. Students of SC and ST categories get priority in allocation of hostel accommodation.
Travelling allowance	Candidates of the reserved categories receive sleeper/II class rail or bus fare by the shortest route for attending interview and joining the institute.

SC, ST and OBC candidates will be required to produce the original caste/tribe certificate issued by a competent authority in the prescribed format (given in <http://www.upsc.gov.in/recruitment/scst.htm>).

For any category of disability (viz., locomotor, visual, speech and hearing), benefit would be given to those candidates who have at least 40% permanent physical impairment in relation to a body part/system/extremity/extremities/whole body, etc. Candidates in this category will be required to produce a certificate issued by a competent authority (mentioned in <http://nhrc.nic.in/Publications/DisabledRights.pdf>) in the prescribed format (given in <http://upsc.gov.in/recruitment/med-handi.htm>).

The candidate must produce the applicable documents **in original at the time of interview**, if he/she wishes to avail of the benefits offered by the reservation policy.

ACADEMIC PROGRAMMES: SCOPE, ELIGIBILITY AND SELECTION PROCEDURE

BACHELOR OF STATISTICS (HONOURS) [B STAT (HONS)]

SCOPE

This **three-year** degree programme offers comprehensive instruction in the theory, methods & application of Statistics, in addition to several areas of Mathematics and some basic areas of Computer Science. It also offers optional courses in some other subjects. It is so designed that, on successful completion, the students will be able to pursue higher studies in areas of Statistics & Mathematics, as well as Computer Science, Economics & allied fields, or take up careers as Statisticians in research institutions & scientific laboratories, government departments or industries. This programme is offered only at **Kolkata**.

ELIGIBILITY

In order to be eligible for admission, an applicant should have successfully completed[†] 10+2 years of Higher Secondary Education (or its equivalent) with Mathematics and English as subjects of study.

SELECTION PROCEDURE

All applicants for this programme, except the INMO AWARDEES (see next paragraph), will have to appear for two written tests comprising multiple-choice type and descriptive questions in Mathematics at the 10+2 level. Based on performance in the written tests, a number of candidates are called for interviews.

The written test is **waived** for applicants who have been selected as **INMO AWARDEES** to participate in the International Mathematics Olympiad Training Camp (IMOTC) in the current year or in any previous year, based on their performance in the Indian National Mathematics Olympiad (INMO) conducted by the National Board of Higher Mathematics, Department of Atomic Energy, Government

[†] For all the programmes described below, those who have completed or are due to complete the qualifying examinations for which results are not yet published, may also apply for admission. If selected, their admission to a course or fellowship will be provisional pending the announcement of results. In such cases, however, their applications will be cancelled if the final examinations are not completed before 01 July 2016.

of India. Such candidates will be directly called for interviews. However, like all other candidates, such candidates are also required to apply in the prescribed application form for admission to the programme. **Merely holding an INMO Certificate of Merit from Homi Bhabha Centre for Science Education (HBCSE) or clearing any Math Olympiad organised by any other organisation will not suffice for waiver of written tests for selection to the programme.**

The final selection of candidates for admission to the programme is based on performance in the two written tests (unless waived) as well as the interviews and the final list of candidates selected for admission is announced after completion of all the interviews.

A candidate who has applied for the B Stat (Hons) programme shall have only one subsequent option to switch to the B Math (Hons) programme of the Institute. Candidates who wish to exercise this option must inform the Dean of Studies of their decisions either in writing or by sending an e-mail to admissionsupport@isical.ac.in between May 9 and May 16, 2016. No requests after this date will be entertained.

BACHELOR OF MATHEMATICS (HONOURS) [B MATH (HONS)]

SCOPE

This **three-year** degree programme offers comprehensive instruction in basic Mathematics along with rudimentary courses in Probability, Statistics, Computing and Physics. It is so designed that, on successful completion, the students will be able to pursue higher studies in the areas of Mathematics, Statistics, Computer Science, Mathematical Physics, etc., or take up a career in applications of Mathematics. This programme is offered only at **Bengaluru**.

ELIGIBILITY AND SELECTION PROCEDURE

Eligibility and selection procedure for B Math (Hons) are the same as those for the B Stat (Hons) programme described above. In fact, a common admission test is conducted for both programmes.

A candidate who has applied for the B Math (Hons) programme shall have only one subsequent option to switch to the B Stat (Hons) programme of the Institute. Candidates who wish to exercise this option must inform the Dean of Studies of their decisions either in writing or by sending an e-mail to admissionsupport@isical.ac.in between May 9 and May 16, 2016. No requests after this date will be entertained.

MASTER OF STATISTICS [M STAT]

SCOPE

This **two-year** programme offers advanced-level training in the theory, methods and applications of Statistics along with specialised training in selected areas of Statistics and allied fields. On successful completion of this programme, students will be able to pursue an academic/research career in Statistics, Mathematics, Economics, Computer Science and allied fields, depending on their chosen area of specialization. They will also be able to work competently as Statisticians and specialists in research institutions and scientific laboratories, government departments or industries. This programme is being offered this year at **Kolkata, Chennai and Delhi**.

ELIGIBILITY

In order to be eligible for admission to this programme, an applicant must have

- a three-year Bachelor's degree or a BE/B Tech degree with Statistics as a full subject, or
- a B Math degree from ISI, or
- a Post-Graduate Diploma in Statistical Methods with Applications/Statistical Methods and Analytics from ISI.

SELECTION PROCEDURE

Students with B Stat (Hons) degree from ISI are offered direct admission to this programme without any selection test or interview. For all other eligible candidates, including students with a B Stat (Pass) degree from ISI, selection for admission to this programme is based on performance in written admission tests and subsequent interview. Past academic records may also be taken into consideration.

The written admission test is designed to assess competence in the theory and methods of Statistics and comprehension in Mathematics, and has two parts:

- multiple-choice questions in Statistics and Mathematics at the undergraduate level in the first part, and
- short-answer questions in Statistics and Mathematics at the undergraduate level in the second part.

Students with B Stat (Hons) degree from ISI who are directly admitted to this programme study their first year in Kolkata. Other selected candidates study their first year in either Delhi or Chennai as recommended by the Selection Committee.

MASTER OF MATHEMATICS [M MATH]

SCOPE

This **two-year** programme offers advanced-level training in Mathematics. On successful completion of the programme, students will be able to pursue a research/academic career in Mathematics. Depending on the choice of the optional subjects, the students will also be able to work in the fields of Probability Theory and Theoretical Computer Science. This programme is offered in alternate year at Bengaluru or Kolkata. This year it is being offered at **Kolkata**.

ELIGIBILITY

In order to be eligible for admission to this programme, an applicant must have

- a three-year Bachelor's degree in Mathematics, or
- a BE/B Tech Degree, with Mathematics as a full subject and a strong background in Analysis and Abstract Algebra, or
- a B Stat degree from ISI.

SELECTION PROCEDURE

Students with B Math (Hons) degree from ISI are offered direct admission to this programme without any selection test or interview. For all other eligible candidates, including students with B Math (Pass) degree from ISI, selection for admission to the programme is based on performance in written admission tests and subsequent interview. Academic records may also be taken into consideration.

The admission tests will comprise multiple-choice and short-answer type questions in Mathematics at a level corresponding roughly to the Mathematics Honours/Major of Indian universities, with special emphasis on Real Analysis, Linear and Abstract Algebra.

MASTER OF SCIENCE IN QUANTITATIVE ECONOMICS [MS (QE)]

SCOPE

This is a **two-year** advanced programme in Economics and its applications, with special emphasis on quantitative methods. On successful completion of the programme, a student will be able to pursue an academic career in Economics or take up responsible positions in various private and public sector organisations. It is offered simultaneously at **Kolkata** and **Delhi**.

ELIGIBILITY

In order to be eligible for admission to this programme, an applicant must have

- a three-year Bachelor's degree in Economics/Mathematics/Statistics/Physics, or
- a B Stat degree from ISI, or
- a BE/B Tech degree with knowledge of Economics and Mathematics at the undergraduate level.

SELECTION PROCEDURE

Selection of candidates to this programme will be based on performance in written tests and subsequent interview. Academic records may also be taken into consideration. The written admission tests will comprise multiple-choice and short-answer questions in **both Economics and Mathematics at the undergraduate level.**

MASTER OF SCIENCE IN QUALITY MANAGEMENT SCIENCE [MS (QMS)]

SCOPE

This is a **two-year** programme in Quality Management and its applications with a special emphasis on Quantitative Methods. It also includes Dissertation in the third semester and a live Project work in the fourth semester under the direct guidance of the faculty. The course offers a flexible format for those who want to meet specific educational and career objectives. Students aspiring to undertake this programme will enhance their career options by gaining the contemporary knowledge and perspective required of Quality Analysts, Quality Managers and those who are responsible for one or more aspects of quality improvement.

The first two semesters will be offered at **Bengaluru** whereas the third semester will be at **Hyderabad**. The fourth semester, the Project work, will be at respective locations.

ELIGIBILITY

In order to be eligible for admission to this programme, an applicant must have

- a three-year Bachelor's degree with Mathematics as a subject, or
- a BE/B Tech degree.

SELECTION PROCEDURE

Selection of candidates to this programme, including the sponsored ones, will be based on performance in written tests and subsequent interview. Academic records may also be taken into consideration. The written admission tests will comprise of

multiple-choice and/or descriptive questions in **Mathematics at the undergraduate level**.

There is, however, a provision for **sponsorship** by government, semi-government, public sector undertakings, autonomous institutions and commercial/ industrial organizations, which can sponsor candidates from their establishments, provided they satisfy the eligibility requirements. The Institute, at its discretion, may apply a different criterion for such candidates. A candidate would be considered sponsored only if the employer gives him/her leave and full salary for the entire duration of the programme. Sponsored candidates will not receive any stipend and their sponsors will have to pay a tuition fee of ₹ 20,000/- per year.

MASTER OF SCIENCE IN LIBRARY & INFORMATION SCIENCE [MS (LIS)]

SCOPE

This is a **two-year** advanced programme in Library & Information Science, with special emphasis on applications of information technology. On successful completion of this programme, a student will be able to pursue an academic career or take up responsible positions in various private and public sector organisations in the Library & Information fields. The objectives of this programme are to develop manpower capable of

- effectively and efficiently working as information professionals at higher levels in libraries & information centres;
- design and development of information systems;
- contributing to the discipline of Library & Information Science in terms of research and teaching.

This programme is offered only at **Bengaluru**.

ELIGIBILITY

The minimum qualification for admission to this programme is a three-year undergraduate degree in any discipline.

SELECTION PROCEDURE

Selection of candidates will be based on performance in written tests and subsequent interview. Academic records may also be taken into consideration.

MASTER OF TECHNOLOGY IN COMPUTER SCIENCE [M TECH (CS)]

SCOPE

This **two-year** programme is designed to provide a balance of theoretical and professional training in Computer Science and Technology so that the students, on successful completion of the programme, may take up

- a professional career in the technology of software for computer systems or specialised application areas, or
- an academic career for further study and research in the fundamental and applied aspects of Computer Science and Technology and related disciplines.

This programme is offered only at **Kolkata**.

ELIGIBILITY

A candidate seeking admission to this programme should possess

- a Master's degree in Mathematics/Statistics/Physics/Electronic Science/Computer Science/Computer Applications/Information Technology, or
- a BE/B Tech degree or any other qualification considered equivalent (such as AMIE or, GRADIETE or, DOEACC 'B' Level).

SELECTION PROCEDURE

A candidate is admitted to this programme through written tests and interview. A few candidates may be sponsored by government, semi-government, public sector undertakings and autonomous institutions but such candidates will also be admitted through the ISI Admission Test; the Institute at its discretion may apply a different criterion for such candidates. A candidate would be considered sponsored only if he/she is granted leave and full salary by the employer for the entire duration of the course. Sponsored candidates will not receive any stipend and their sponsors will have to pay a tuition fee of ₹ 20,000/- per year.

The written Admission Test typically consists of two parts:

- (i) a multiple-choice and/or descriptive test in Mathematics at the undergraduate level;
- (ii) a multiple-choice and/or descriptive test comprising the following:
Group A: A test for all candidates in Mathematics at the undergraduate level and in logical reasoning.

Group B: A test, divided into five sections carrying equal marks, in Mathematics, Statistics and Physics at the postgraduate level and in Computer

Science, Engineering and Technology at the B Tech level. Candidates must answer questions from any one of these sections.

A candidate with a valid GATE score above a threshold (to be decided by the Selection Committee) in his/her own subject will be directly called for interview. Final selection of such candidates would be based on their academic records and their performance in the interview. These candidates are required to apply, like all other candidates, in the prescribed application form.

MASTER OF TECHNOLOGY IN QUALITY, RELIABILITY & OPERATIONS RESEARCH [M TECH (QROR)]

SCOPE

This is a full-time **two-year** programme and is offered only at **Kolkata**. It is intended to produce specialists in Quality Management with emphasis on Statistical Quality Control, Reliability, Operations Research, and Management Systems. Enough background on computing technologies is provided to enable the students to use technology effectively.

The programme is designed to offer adequate instruction in the theory and practice of the above disciplines. The objective is to equip students with the basic practical skills with sufficient theory to understand the principles involved in the application and to develop in them the power of systematic thinking and reasoning, practical approach and exposition. Every student, besides undergoing classroom instruction, shall do practical work by way of case studies, dissertation or project work on live problems under the guidance of the expert faculty members of ISI. On successful completion of this programme, the students may take up either

- a professional career in the field of quality engineering and management in departments of government, semi-government, public/private sector undertakings, industrial organizations, consultancy agencies, or
- an academic career for further study and research in theoretical and applied aspects of Quality, Reliability and Operations research in organizations of higher learning and research institutions.

ELIGIBILITY

A candidate seeking admission to this programme must

- be conversant with Mathematics at the graduate level;
- have secured pass marks in Physics and Chemistry at the (10+2) level;
- possess any of the following minimum qualifications:

- (i) a Master's Degree in Statistics;
- (ii) a Master's Degree in Mathematics with Probability and Statistics as major subjects;
- (iii) a BE/B Tech degree or any other qualification considered equivalent;

The programme is offered in two streams:

- **Statistics Stream** for candidates with qualifications (i) or (ii) mentioned above;
- **Engineering Stream** for candidates with an undergraduate degree in Engineering or Technology as in (iii) above.

SELECTION PROCEDURE

All candidates, including sponsored ones, are admitted through written tests and interview. For admission to this course, valid GATE score is not necessary, and candidates with valid GATE scores also must take the written tests. There is, however, a provision for sponsorship by government, semi-government, public sector undertakings, autonomous institutions and industrial organisations, which can sponsor candidates from their establishments, provided they satisfy the eligibility requirements. The Institute, at its discretion, may apply a different criterion for such candidates. A candidate would be considered sponsored only if the employer gives him/her leave and full salary for the entire duration of the programme. Sponsored candidates will not receive any stipend and their sponsors will have to pay a tuition fee of ₹ 20,000/- per year.

The Admission Test consists of two parts:

- a multiple-choice and/or descriptive test in Mathematics at the undergraduate level;
- a multiple-choice and/or descriptive test for the two streams as follows:
Part I (for Statistics Stream): A test divided into two sections carrying equal marks, in Statistics and Probability. Candidates must answer questions from both the sections.

Part II (for Engineering Stream): A test divided into two sections carrying different marks, in Mathematics and Engineering. The Engineering section will have questions on Thermodynamics, Engineering Mechanics, Electrical & Electronics Engineering and Engineering Drawing. Candidates must answer questions from both the sections.

POSTGRADUATE DIPLOMA IN STATISTICAL METHODS & ANALYTICS

SCOPE

The programme is intended to provide students with a comprehensive training in basic theory and applications of Statistical Methods and Analytics, in addition to some exposure to Mathematics and Computer Science. It is so designed that on successful completion, the students will be able to take up jobs as statisticians in such departments of government and industries where application of Statistics and Analytics is required.

The total duration of this programme is **one year**, and **it is offered at the ISI North-East Centre, Tezpur, Assam, exclusively for the domiciled students of the North-Eastern states of India.**

A prestigious multinational IT consultation and services company has signed a Memorandum of Understanding with ISI that gives placement opportunities to successful students.

ELIGIBILITY

In order to be eligible for this programme, an applicant must be a graduate in any stream including Engineering/Technology with one paper in Mathematics, and a domicile certificate of North-Eastern states from a recognised authority.

SELECTION PROCEDURE

Selection is based on the performance in written test and interview. Past academic records may also be taken into consideration. The admission test will comprise multiple-choice and/or descriptive questions on Basic Mathematics.

POSTGRADUATE DIPLOMA IN COMPUTER APPLICATIONS

SCOPE

The programme is intended to provide students with a comprehensive training in computer programming, and an introduction to the theory and applications of computer science, in addition to some exposure to Mathematics and Statistics. It is so designed that on successful completion, the students will be able to take up jobs as computer programmers and/or data entry operators in such departments of government and industries where computer programming and database management are required.

The total duration of this programme is **one year**, and **it is offered at the ISI Giridih Branch. There is no stipend or tuition fee for the course.**

ELIGIBILITY

A student must have at least a 3-year Bachelor's degree with Mathematics as one of the subjects from a recognized university/ institute.

SELECTION PROCEDURE

Selection is based on the performance in written test and interview. Past academic records may also be taken into consideration. The admission test will comprise multiple-choice and/or descriptive questions on Basic Mathematics.

POSTGRADUATE DIPLOMA IN BUSINESS ANALYTICS

SCOPE

The Post Graduate Diploma in Business Analytics (PGDBA) – jointly offered by IIM Calcutta, IIT Kharagpur, and ISI Kolkata – aims to help shape the emerging profession of business analytics by delivering a cutting edge interdisciplinary educational experience to graduate applicants with an aspiration of building a career in this field. PGDBA is a two year full time diploma programme aimed at creating business analytics professionals employable by leading Indian and foreign firms.

Students successfully graduating from the programme will be expected to join organizations working in the area of analytics. Those interested in higher studies may pursue doctoral or other advanced studies in areas related to analytics.

ELIGIBILITY

A candidate must hold a graduate/post graduate degree with any of the following:

- 10+2+4 : Minimum of 60% marks in the BS/BTech/BE or equivalent Level
- 10+2+5: Minimum of 60% marks in the Integrated Masters or equivalent Level
- 10+2+3+2: Minimum of 60% marks in the Masters Level

For SC/ST and Differently Abled (DA) category candidates, the qualifying marks for eligibility shall be 55%. Candidates, who are in the final year, are also eligible to apply provided they appear in the final examination and complete other academic requirements as specified above by May 31, 2016. For such cases, admission will be provisional subject to meeting the 60% for General/OBC category candidates and at least 55% aggregate marks or equivalent for SC/ST and DA

category candidates. Proof of having passed the qualifying degree with required eligibility, as specified above should be submitted by October 31, 2016.

SELECTION PROCEDURE

A written test will be held on February 14, 2016, to shortlist candidates for personal interviews. Candidates shortlisted after the written test will be called for personal interview to be held in March, 2016. The final offer would be made on the basis of performance in the written test, personal interview, work experience, and academic background.

See <http://www.iitkgp.ac.in/pgdba/> for further details.

JUNIOR/SENIOR RESEARCH FELLOWSHIPS (JRF/SRF)

RESEARCH FELLOWSHIPS IN STATISTICS, MATHEMATICS, QUANTITATIVE ECONOMICS, COMPUTER SCIENCE, AND QUALITY, RELIABILITY & OPERATIONS RESEARCH (QROR)

SCOPE

The Institute offers Junior Research Fellowships in Statistics, Mathematics, Quantitative Economics, Computer Science (CS) (see also <http://www.isical.ac.in/~deanweb/phdcs/>), and Quality, Reliability and Operations Research (QROR). A candidate admitted as a Junior Research Fellow, and applying for registration for Ph D in the relevant discipline, will generally be required to successfully complete mandatory course-work involving at least five courses from the list of courses for that discipline. He/she is expected to engage in original research work in one of the above areas under the guidance of a supervisor appointed by the Institute, culminating in a doctoral thesis to be submitted for the Ph D degree of the Institute. Candidates making satisfactory progress towards the above goal are eligible to register for the Ph D degree of ISI. At the end of the second year, the Junior Research Fellows are assessed for the award of Senior Research Fellowships. The total duration of Junior and Senior Research Fellowships **shall not exceed six (6) years**.

An enhanced Special Research Fellowship is also available for outstanding candidates in the above disciplines.

CENTRES

The names of the centres along with the respective subjects in which junior/senior research fellowships are being offered this year are given below.

CENTRE	SUBJECT
Kolkata	Statistics, Mathematics, Quantitative Economics, Computer Science, Quality, Reliability & Operations Research (QROR)
Delhi	Statistics, Mathematics, Quantitative Economics, Quality, Reliability & Operations Research (QROR)
Bengaluru	Statistics, Mathematics, Computer Science [‡]
Chennai	Statistics, Mathematics, Computer Science [‡] , Quality, Reliability & Operations Research (QROR)

ELIGIBILITY

Statistics

- A good academic record with M Stat, MA/M Sc or equivalent degree in Statistics, or
- outstanding mathematical maturity with B Stat/B Math, BA/B Sc or equivalent degree with Statistics as the main subject.

Mathematics

- A good academic record with M Stat, M Math, MA/M Sc or equivalent degree in Mathematics, or
- outstanding mathematical maturity with B Stat/B Math, BA/B Sc or equivalent degree with Mathematics as the main subject.

Quantitative Economics

- A good academic record with MS (QE), M Stat, MA/M Sc or equivalent degree in Statistics/Mathematics/Economics/Econometrics, or
- a BA/B Sc degree with Economics as the main subject, and outstanding mathematical maturity; or
- a Master's degree in any subject with Mathematics/Statistics as a full subject at the undergraduate level, along with sufficient knowledge of Economics; or
- a 4-year B Tech degree with sufficient coursework in Mathematics/Statistics and Economics.

[‡] JRF(CS) selected at Bengaluru or Chennai Centres may have to come to ISI Kolkata for completing the necessary coursework.

Computer Science

- A good academic record with ME/M Tech or equivalent degree in Electronics/Telecommunication/Radio Physics/Computer Science/Electrical Engineering/ Microwave Communications/ Information Technology/ Bioinformatics/Biotechnology with Mathematics as a compulsory subject, or
- a good academic record with M Sc/MCA/MA or equivalent degree in Physics/Mathematics/Applied Mathematics/Statistics/Electronic Sciences/Computer Science/ Atmospheric Science/ Information Technology/ Bioinformatics/ Biotechnology with Mathematics as a compulsory subject at the graduate level, or
- a BE/B Tech or equivalent degree in the above subjects with outstanding results.

Quality, Reliability & Operations Research (QROR)

- A good academic record with M Tech/ME/MS/M Phil or equivalent degree in Quality/Reliability/Operations Research, or
- a good academic record with M Stat/M Sc/MA or equivalent degree in Mathematics/Statistics/Physics with Mathematics as a compulsory subject at the graduate level, or
- a BE/B Tech or equivalent degree in the above subjects with outstanding results.

SELECTION PROCEDURE

Subject to the eligibility criteria being satisfied, the selection of candidates for this programme is strictly based on merit as judged by performance in Admission Test and interview. Past academic records may also be taken into consideration.

Note: For an applicant who has obtained a Master's degree in the relevant discipline from ISI with at least 75% in the aggregate without any back-paper or compensatory examination in any course during the entire programme, and is applying within two years of graduating, the written test will be waived, and he/ she will be called directly for interview by the corresponding JRF selection committee. However, such candidates are also required to apply, like all other candidates, in the prescribed application form.

Note: Candidates who have been awarded a Junior Research Fellowship in the afore-mentioned research areas by NBHM/CSIR/UGC/ICMR/DST/DBT based on a nationally conducted written Admission Test, are also required to clear the JRF

admission test or an equivalent separate test conducted by the relevant JRF selection committee of the institute, if they wish to obtain a Ph D degree from ISI.

CURRENT RESEARCH INTERESTS AT DIFFERENT CENTRES

KOLKATA

Statistics: Asymptotic Theory in Statistics, Decision Theory, Statistical Inference: parametric, non-parametric and semi-parametric, Bayesian Analysis, Model Selection, Resampling Plans, Sequential Analysis, Sequential Plan, Multivariate Analysis, Parametric/Non-parametric Regression Analysis, Robustness, Minimum Distance Methods, Discrete and Categorical Data Analysis, Linear Models, Parametric/Non-parametric Discriminant Analysis, Biostatistics, Environmental Data Analysis, Survival Analysis, Reliability, Directional Data Analysis, Growth Curve Modelling, Exploratory Data Analysis, Ranking and Selection, Constructional and Combinatorial Aspects of Designs, Optimal Designs, Sampling Theory and Surveys, Small Area Estimation, Inference in High Dimensional Models. Applications of Statistics in Geology, Molecular Biology, Human Genetics, Social Sciences and Industrial (Quality) Engineering; GIS Applications, Statistical Computation, Cryptology, Statistical Pattern Recognition, Image Analysis, HIV/AIDS Modelling. Clinical Trial, Majorisation, Brain Mapping.

Mathematics: Functional Analysis, Geometry of Banach Spaces, Algebraic and Differential Topology, Symplectic Topology, Transformation Groups, Harmonic Analysis, Commutative Algebra and Affine Algebraic Geometry: Projective Modules and Euler Class Groups, Affine Fibrations, Locally Nilpotent Derivatives and allied areas, Combinatorics, Graph Theory, Mathematical Logic, Set Theory and Descriptive Set Theory, Spectral Theory of Differential Operators, Noncommutative Geometry, Cryptology, Stochastic Processes, Probability Inequality, Large Deviations, Stochastic Calculus, Financial Mathematics, Markov Chains, Diffusion, Limit Theorems, Stochastic Approximations, Random Matrices, Extreme Value Theory, Heavy Tails and Long Range Dependence.

Quantitative Economics: Microeconomics, Macroeconomics, International Trade, Development Economics, Welfare Economics, Game Theory, Voting Theory, Contract Theory, Industrial Organisation, Financial Economics, Finance, Convergence, Social Choice, Political Economy, Public Economics, Economic Growth, Indian Economic Problems, Agricultural Economics, Environmental Economics, Time Series Econometrics, Financial Econometrics, Empirical/Applied Econometrics, Poverty and Inequality, Polarisation, Experimental Economics,

Economics of Conflict, Public Choice, Social Economics, Analytical Marxism, Theories of Distributive Justice.

Computer Science: Computer Networks—*ad hoc*, Wireless Sensor, Wireless Mesh, UMTS Network Design; Parallel and Distributed Computing, Mobile Computing, Cluster Computing, Parallel/Distributed Architectures and Algorithms; Nanotechnology and Gigascale Integration, Electronic Design Automation Algorithms and Testing, Biochips and Nano-biosystems, Intellectual Property Protection of SoCs, Quantum Computing, Fault Tolerance; Computational Geometry, Graph Theory, Combinatorial Optimisation, Algorithms and Computational Complexity; Computational Molecular and Systems Biology, Bioinformatics; Pattern Recognition, Machine Learning, Artificial Intelligence, Web Intelligence and Web Mining, Social Network Analysis, Text Mining, Data Mining, Information Retrieval, Natural Language Processing, Computational Linguistics; Computer Vision, Cognitive Vision, Digital Document Processing, Image and Video Processing, Content-based Image Retrieval, Computer Graphics, Biomedical Image Processing, Video Surveillance; Speech and Signal Processing; Artificial Neural Nets, Case Based Reasoning, Evolutionary Computing, Fuzzy Sets and Systems, Fuzzy Control, Granular Computing, Soft Computing, Computing with Words, Rough Sets, Swarm Intelligence, DNA-Computing; Mathematical Morphology, Fractals, Wavelets; Artificial Immune System, Neurodynamics; Digital Watermarking; Atmospheric Science, Remote Sensing; Theory and Applications of Cellular Automata; Cryptology, Coding Theory, Information Theory, Perception Engineering, Computational Neuroscience.

Quality, Reliability & Operations Research (QROR): Business Analytics and Data Mining, Six Sigma and Lean Six Sigma, Mathematical Programming, Reliability Models, Process Control, Process Optimisation.

DELHI

Mathematics: Algebraic groups over arbitrary fields. Algebras with involutions. Galois cohomology. Non-associative algebras and exceptional algebraic groups. Quadratic forms. Quantum groups, non-commutative geometry, operator algebras, KK-theory. Analysis and geometry of matrices and linear operators. Generalised inverse of a matrix. Matrices and graphs. Number theory, Diophantine equations, irreducibility of polynomials, prime numbers. Cryptography. Combinatorial optimisation problems. Extreme value theory. Interacting particle systems. Markov chains. Markov processes and martingale problems. Percolation theory. Random

graphs, probability on trees. Random walks in random environments. Stochastic differential equations. Stochastic filtering theory. Stochastic control. Urn models.

Statistics: Computational biology. High-dimensional data. Penalised regression. Resampling methods. Reliability. Non-linear regression. Non-parametric inference. Statistical computing. Statistical graphics. Statistical signal processing. Surrogate data. Survival analysis.

Quantitative Economics: Optimisation Theory, Game Theory and Applications, Mechanism Design, Auction Theory, Choice Theory, Industrial Organisation, International Trade and Finance, Macroeconomic Theory, Growth Theory and Empirics, Applied Econometrics, Political Economy, Empirical and Theoretical Development Economics, Economics of Education, Health Economics, Agricultural Economics, Environmental and Natural Resource Economics, Experimental Economics, Economics of Terrorism and Conflict.

Quality, Reliability & Operations Research (QROR): Complementarity Problems, Game Theory, Design of Experiments.

BENGALURU

Mathematics: Algebraic Geometry, Algebraic Groups, Coding Theory, Ring theory, Operands, Finite Geometry, Finite Groups, Buildings, Number Theory, Topology, Combinatorial Topology, Complex geometry, Differential geometry. Probability Theory, Stochastic Processes, Diffusion Processes, Reflected Diffusion, Martingale problems, Interacting particle systems, Probability measures on groups. Functional Analysis, Geometry of Banach spaces, Operator Theory, Operator Algebras, Quantum Probability, Hilbert Modules.

Computer Science: Mathematical Morphology, Digital Geometry, Earth Systems Science, Spatial Informatics, Theoretical GISci and Geocomputation, Satellite Remote Sensing Data Analysis, Digital Image Processing, Digital Geographics, Modeling the behavior Complex Terrestrial Systems via Chaos and Bifurcation Theories, Fractals and Multifractals. Neuroinformatics: Interface between brain science and computer science from signal processing, information theory and coding theory point of view with realistic applications in experimental and clinical sciences. Equal emphasis is on quantitative science and medical science. Information Granulation, Granular Computing, Pattern Recognition, Machine Learning, Image and Video Processing, Soft Intelligence Computing, Computational Intelligence.

Quantitative Economics: Development economics, Agricultural economics.

HYDERABAD

Quality, Reliability & Operations Research (QROR): Operations Research and Mathematical Modeling.

CHENNAI

Statistics: Quantitative Finance, Reliability, Survival Analysis.

Mathematics: Complex analysis, Mathematical Logic, Game theory.

Quality, Reliability & Operations Research (QROR): Semidefinite Linear Complementarity Problems, Stochastic Games, Optimisation, Cooperative games, Reliability and Operations Research.

Theoretical Computer Science: Cryptography, Graph theory, Algorithms, Logic and Games, Formal epistemology.

JUNIOR/SENIOR RESEARCH FELLOWSHIPS IN OTHER SUBJECTS

SCOPE

The Institute also offers Junior/Senior Research Fellowships in several areas of the Natural Sciences and the Social Sciences. However, candidates working for Ph D in any area other than the five mentioned in page no. 23, need to register with other Universities/Institutes for their Ph D degree. A student is initially admitted as a Junior Research Fellow. After two years of satisfactory progress including successful completion of mandatory course work, Junior Research Fellows are assessed for the award of Senior Research Fellowships. The combined duration of the Junior and Senior Research Fellowships is **six** years. The areas in which the Institute wants to recruit JRFs this year and the respective eligibility conditions for applying for admission are as follows:

Physics and Applied Mathematics: Quantum Mechanics, Quantum Information, Condensed Matter Physics, High Energy Physics, Quantum Field Theory, Cosmology and Astrophysics, Nonlinear Dynamics.

Eligibility: A consistently good academic record with M Sc in Physics/Mathematics/Statistics or equivalent.

Agriculture and Ecology: (1) Search for safe and effective natural food preservatives (2) Bioactive compounds or semiochemicals in plants and microbes; Weed Biology, utilization and management.

Eligibility: A good academic record with (1) MSc in Botany/Zoology/Biochemistry/Microbiology or (2) MSc in Botany/Microbiology/Biochemistry/Biotechnology/Agriculture.

Geology: Structural Geology and Tectonics, Vertebrate Paleontology and Stratigraphy.

Eligibility: A consistently good academic record with M Sc in Geology or equivalent.

Library and Information Science: Semantic Web, Data Repositories

Eligibility: A consistently good academic record with first or high second class in MS (LIS) awarded by ISI or Associateship in Documentation and Information Science of ISI or NISCAIR/INSDOC or its equivalent degree (such as Master's degree in Library and Information Science from any University) with at least 55% marks.

Development Studies: Agriculture and Rural Development, Labour Studies, Village Studies, Gender Studies, Statistical Databases.

Eligibility: A good academic record with Masters or M Phil degree in Development Studies, Sociology, Economics, Agricultural Economics or any equivalent degree.

CENTRES

The names of the centres along with the respective subjects in which research fellowships in other subjects are being offered this year are given below.

CENTRE	SUBJECT
Kolkata	Physics and Applied Mathematics, Agriculture and Ecology, Geology
Bengaluru	Library and Information Science, Development Studies

SELECTION PROCEDURE

Subject to satisfying the eligibility criteria, the selection of candidates for JRF is strictly based on merit as judged by their performance in Admission Tests and interview. Past academic records may also be taken into consideration.

Note: Candidates who have been awarded a Junior Research Fellowship by NBHM/CSIR/UGC/ICMR/DST/DBT based on a nationally conducted written Admission Test, may also be required to clear the JRF admission test or an equivalent separate test conducted by the relevant JRF selection committee of the institute.

DOCTORAL DEGREES

DOCTOR OF PHILOSOPHY [PH D]

The degree of Doctor of Philosophy is awarded to a candidate for original contribution in a chosen field of research in the areas: Statistics, Mathematics, Quantitative Economics, Computer Science, and Quality, Reliability & Operations Research (QROR). For this purpose, it is necessary for any candidate to register for this degree under a supervisor and subsequently submit a thesis embodying his/her research work for evaluation by a panel of examiners.

Eligibility conditions for registration as a candidate for the Ph D degree of Indian Statistical Institute are available on the webpage <http://www.isical.ac.in/~deanweb/phdrules.html>.

All correspondence regarding registration and other matters connected with Ph D degrees may be addressed to the **Convener** of the **Ph D–D Sc Committee** of the concerned discipline at the address: **Indian Statistical Institute, 203, B T Road, Kolkata 700 108.**

DOCTOR OF SCIENCE [D SC]

This is an award for outstanding published work.

ELIGIBILITY

The D Sc degree is awarded only in exceptional cases on the basis of outstanding published work. Only those who satisfy one of the following requirements are considered for the award.

- (i) B Stat (Hons)/B Math (Hons) degree or the Statistician's diploma of the Indian Statistical Institute and at least eight years of independent research work in Statistics.
- (ii) M Stat degree or Certificate of successful completion of the Two/ Three-year Advanced Statistician's Course of the Indian Statistical Institute and at least four years of independent research.
- (iii) Ph D degree of the Indian Statistical Institute and at least two years of subsequent research.
- (iv) At least eight years of research work in the field of Statistics after the Bachelor's degree of a recognized university or institute of which at least one year of work must be at the Indian Statistical Institute.

All correspondence regarding registration and other matters connected with D Sc degrees may be addressed to **Convener, Ph D–D Sc Committee, Indian Statistical Institute, 203, B T Road, Kolkata 700 108.**

OTHER INFORMATION FOR PROSPECTIVE STUDENTS

For all the regular degree courses, each academic year is divided into two semesters separated by a short break. The first semester (Semester I) for all the courses usually starts in July/August and ends in November/December. The second semester (Semester II) starts in January and, for all the courses other than the two M Tech programmes and MS (QMS), usually ends in May. For the two M Tech programmes and MS (QMS), Semester II usually ends in July, after summer training for M Tech (CS) and after field training for M Tech (QROR) and MS (QMS). Classes are held on weekdays (Monday to Friday) during 9:30/10 am to 6 pm unless mentioned otherwise.

STUDENTS' BROCHURE

Details of the courses along with the rules and regulations pertaining to the academic programmes of the Institute are given in the Students' Brochure. A periodically updated version of the Students' Brochure is available on the internet at <http://www.isical.ac.in/~deanweb> in a downloadable PDF format.

Note: The Institute reserves the right to make changes in course structure, selection procedure, etc. as and when needed.

STIPENDS, FELLOWSHIPS AND ALLOWANCES

All non-sponsored students and research fellows admitted to various programmes, except the Postgraduate Diploma in Computer Applications, receive stipends, fellowships and contingency/book grants as given below. Non-sponsored candidates are not required to pay any tuition fee for any of the programmes. Stipends are granted in the first instance for one semester/academic year only. They are renewed periodically if the progress of the student is found satisfactory. **Stipend/Fellowship granted to a student may be reduced or completely withdrawn if the academic progress, attendance in class, or character and conduct of the student are not found satisfactory.** Details of the rules pertaining to this are available in the appropriate Students' Brochure. Students leaving in the middle of a course have to refund the stipend/contingency grant received, if any. At the end of each year/semester, prizes are also awarded for outstanding performance in examinations.

Research Fellows with ME/M Tech or equivalent will be entitled to enhanced junior and senior research fellowships.

A Special Research Fellowship of ₹ 32000 per month (JRF-level)/₹ 36000 per month (SRF-level) may be awarded to outstanding candidates in each of the following subjects: (i) Statistics, (ii) Mathematics, (iii) Computer Science, (iv) Quantitative Economics, and (v) Quality, Reliability & Operations Research.

PROGRAMME	Stipend/Fellowship Per month (₹)	Contingency/book grant per year (₹)
B Stat (Hons)/B Math (Hons)	3000	3000
M Stat/M Math/MS(QE)/MS(LIS)/MS(QMS)	5000	5000
M Tech (CS)/M Tech (QROR)	8000	5000
Post-Graduate Diploma in Statistical Methods and Analytics	2000	2000
Junior Research Fellowship (JRF)	25000/28000 [§] + HRA as per rules	28000
Senior Research Fellowship (SRF)**	28000/32000 [‡] + HRA as per rules	28000
Special Research Fellowship	32000/36000 + HRA as per rules	100000

DISCIPLINARY POLICY

Every student of the Institute is expected to observe the normal discipline of the Institute and shall not indulge in cheating in the examinations, unruly behaviour or any other act of indiscipline or unlawful/unethical/indecent behaviour. There are also specific attendance requirements that the students are expected to meet, details of which are mentioned in the **Students' Brochure**. Violations of these are likely to attract punishments such as withdrawal of stipend, withholding of promotion/award of degree, and/or expulsion from the hostel/Institute.

Ragging is banned in the Institute. If any incident of ragging comes to the notice of the authorities, the concerned student will be given an opportunity to explain his/her action(s), and if the explanation is not found to be satisfactory,

[§] For research fellows with ME/M Tech or equivalent.

** after two years as JRF

he/she may be expelled from the institute. The punishment may also take the shape of

- (i) suspension from the Institute for a limited period,**
- (ii) suspension from classes for a limited period,**
- (iii) withholding of stipend/fellowship or other benefits,**
- (iv) withholding of results,**
- (v) suspension or expulsion from hostel.**

Local laws governing ragging are also applicable to the students of the Institute.

HOSTEL

The Institute has hostels for the students in its premises in Kolkata, Delhi, Bengaluru, Chennai, Hyderabad, Tezpur. The campus at Giridih also has rudimentary hostel facilities. However, it may not be possible to accommodate all degree/diploma students in the hostels. Limited medical facilities are available free of cost at all campuses.

PLACEMENT OF STUDENTS

Students who have undergone the B Stat (Hons), B Math (Hons), M Stat, M Math, MS (QE), M Tech (CS), M Tech (QROR) and other degree, diploma/certificate courses of the Institute and those having the Ph D degree of the Institute are now well placed in government and semi-government departments, public and private sector undertakings, industries and research/educational institutions, both in India and abroad. Most of the students of the Institute get employment offers or admission to some Ph D programmes even before they complete the qualifying degree examinations.

There is a Placement Committee in Kolkata, which arranges campus interviews by prospective employers. Campus interviews are also organised at the Delhi and Bengaluru Centres.

A prestigious multinational IT consultation and services company has signed a Memorandum of Understanding with ISI that gives placement opportunities to successful students of the PG Diploma programme at the ISINE centre.

EXAMINATION, RULES FOR PASSING AND PROMOTION

EXAMINATIONS

There are two examinations in each course in all programmes: **mid-semester** and **semester** (final). The composite score in a course is a weighted average of the scores in the mid-semester and semester examinations, class tests, home-assignments, practical record-book, project work, etc. (announced at the beginning of the semester).

The minimum composite score required for passing a course (including a non-credit course) is 35%, except for the core courses (Project-I, Project-II, Dissertation, OR-I, SQC-I and Reliability-I) in M Tech (QROR) and (Project, SDM-1, SPC, OR-1, SDM-2, IE, OR-2, SS) in MS (QMS), for which it is 45%.

If the composite score of a student falls short of 45% in a credit course, or 35% in a non-credit course the student may take a **back-paper** examination to improve the score. At most one back-paper examination is allowed in a particular course. The maximum score a student can secure in a back-paper examination is 45%. The maximum number of back-papers that can be taken in any given year of a programme is specified in the Students' Brochure.

If a student misses a mid-semester or a semester or a back-paper examination due to medical or family emergencies, there is a provision for a **supplementary** examination. The student can score at most 60% in the supplementary examinations to mid-semester and semester examinations, and at most 45% in the case of a back-paper examination.

In case a student fails to secure pass marks in a course even after the results of **backpaper** examination have been declared, there is provision for a compensatory examination subject to fulfillment of certain conditions, details of which are available in the Students' Brochure.

PROMOTION

Details of rules for promotion from one year to the next year of an academic programme are given in the Students' Brochure.

A student who fails to meet the passing criteria in any given year of a programme is permitted to repeat the year, subject to a maximum of two repeat years (any one of the first two years and the final year) for the undergraduate programmes

and one for all others. The final course-wise score in a year being repeated is the maximum of the scores obtained in the two years.

FINAL RESULT

If a student has passed in all the semesters and his/her conduct has been found to be satisfactory, he/she is awarded the degree in the **First Division with distinction** or **First Division**, or **Second Division** or **Pass** (in some programmes), depending upon criteria specified in the Students' Brochure.

APPLICATION PROCEDURE

Application to the programmes being offered by Indian Statistical Institute in the academic year 2016-17 must be done online through the Indian Statistical Institute (ISI) Admission Portal link available at <http://www.isical.ac.in/~admission>. The only exception is the PG Diploma in Statistical Methods and Analytics (see below). For this purpose, an applicant must have access to the Internet, digital copy of his/her photograph, scanned copy of signature, an email account, Acrobat reader, and a printer for printing the admit card.

Digital images of the photograph and the signature of the applicant must be in any of the formats bmp/gif/png/jpg/jpeg, with sizes as specified below:

1. Applicant's Photo: 600 pixels (width) × 600 pixels (height), maximum permissible image size being 50KB,
2. Applicant's Signature: 800 pixels (width) × 300 pixels (height), maximum permissible image size being 30KB.

The applicant must initially register at the ISI Admission Portal and create a login account, followed by the filling up of the application form and upload of the photograph and signature. After completion of application at the ISI Admission Portal, the applicant will be directed to State Bank of India Collect website for fee payment. However, the payment of application fee can be done ONLY after two working days from the date of completion of application at the ISI Admission Portal. The applicant will need APPLICATION NO. and DATE OF BIRTH information for payment of application fee. APPLICATION NO. can be retrieved after selecting ADMISSION STATUS link of the ISI Admission Portal. See “Mode of Payment” (page 39) for the next step.

Once the admit card is generated, applicants will be notified in their portal or by e-mail about the generation of the admit card. They will be required to take a printout of the admit card to bring to the test centres.

Applicants from outside India are requested to contact the Dean's office at the following e-mail address: dean@isical.ac.in with subject: Admission 2016-2017.

APPLICATION FEE

- ₹ 600.00 for all applicants in the **general category** and for all JRF programmes (irrespective of reservation category)

- ₹ 300.00 for applicants belonging to **SC/ST/OBC/Physically Challenged categories**, for all programmes (excluding the JRF programmes)

Only for the *PG Diploma in Statistical Methods and Analytics* programme, the application Form and Prospectus can also be purchased from the ISI North-East Centre either in person or by post by

- paying the application fee in Cash at the Office of Indian Statistical Institute, North-East Centre, Tezpur University Campus, Tezpur, Assam 784028 (between 10 am to 5 pm on all working days from Monday to Friday); or,**
- sending a DD by post in favour of “ISI NORTH EAST CENTRE” payable at Tezpur, Assam from any nationalized bank. The DD must include an additional postal charge of ₹ 60.**

The completed form only for this PG Diploma programme must then be sent to The Head, Admissions 2016, Indian Statistical Institute, North-East Centre, Tezpur University Campus, Tezpur, Assam 784028, so as to reach not later than 31 March 2016.

MODE OF PAYMENT

For online application, the application fee will be collected through the State Bank of India Collect website. The payment can be made using NetBanking, Debit/Credit Card or through *Challan* for cash payment at the SBI Branch. For payment of application fee, please allow at least TWO working days from the date of completion of application at the ISI Admission Portal. The SBI will collect appropriate additional bank charges on top of the application fee. After two working days from the date of payment of application fee, check the **ADMISSION STATUS** at the ISI Admission Portal for fee verification.

GENERAL INSTRUCTIONS FOR FILLING IN THE APPLICATION FORM

Applicants are advised to study the prospectus carefully and satisfy themselves that they are eligible for admission to the course/fellowship for which they are applying. If at any stage it is found that a candidate does not satisfy the eligibility conditions or the information furnished in the application is incorrect, the application will be cancelled. Those who have completed or are due to complete the qualifying examinations for which results are not yet published, may also apply for admission; if selected, their admission to a course or fellowship will be provisional pending the announcement of results. In such cases, however, their applications will be cancelled if the final examinations are not completed before 01 July 2016. This date may be relaxed by the Institute in case of candidates with outstanding academic record and performance in the selection tests and interviews.

If a student had failed in a programme of the Institute and had been asked to discontinue, he/she is not eligible for readmission to that programme.

The following tables (nos. I-III) contain information regarding the ISI Admission Test that will be needed at the time of filling up of the application form.

Table I: Codes for ISI Admission Test Centres in 2016

Code	Centre	Code	Centre	Code	Centre
AG	Agartala	GT	Guntur	NL	Nainital
AD	Ahmedabad	GH	Guwahati	PT	Patna
BL	Balurghat	HY	Hyderabad	PU	Pune
BG	Bengaluru	IM	Imphal	RP	Raipur
BP	Bhopal	JP	Jaipur	RN	Ranchi
BH	Bhubaneswar	KN	Kanpur	SL	Shillong
CH	Chandigarh	KH	Kharagpur	SG	Siliguri
CN	Chennai	KD	Khardah	SR	Srinagar
CO	Cochin	CC	Kolkata	ST	Surat
DH	Delhi	MD	Malda	TZ	Tezpur
DB	Dhanbad	MN	Mangalore	VN	Varanasi
DG	Dibrugarh	MB	Mumbai	VP	Visakhapatnam
DP	Durgapur	NG	Nagpur		

Table II: Information about Admission Tests for Programmes being offered in 2016

Programme	Code	Forenoon (10.30hrs to 12.30hrs)			Afternoon (14.00hrs to 16.00hrs)		
		Test Subject	Test Type	Test Code	Test Subject	Test Type	Test Code
B Stat	BSTK	Mathematics	MCQ	UGA	Mathematics	Descriptive	UGB
B Math	BMTB	Mathematics	MCQ	UGA	Mathematics	Descriptive	UGB
M Stat	MSTX	Math/Stat	MCQ	PSA	Math/Stat	Descriptive	PSB
M Math	MMTK	Mathematics	MCQ	MMA	Mathematics	Descriptive	PMB
MS(OE) (Kolkata)	MQEK	Mathematics	MCQ	PEA	Economics	Descriptive	PEB
MS (OE) (Delhi)	MQED						
MS (QMS)	MQMY	Mathematics	MCQ	QMA	Mathematics	Descriptive	QMB
MS (LIS)	MLIB	Quantitative Ability, Reasoning Ability	MCQ	PLA	English Language Proficiency, Basic IT, General Aptitude	MCQ	PLB
M Tech (CS)	MCSK	Mathematics	MCQ	MMA	Math/Phys/Stat/Engg/Tech/Comp Science	Descriptive	PCB
M Tech (QROR)	MQRK	Mathematics	MCQ	MMA	Stat/Probability/Math/Engg	Descriptive	PQB
PG Diploma in Statistical Methods and Analytics	DSTT	Mathematics	MCQ	DST	No Test in Afternoon	—————	—————
PG Diploma in Computer Applications	DCAG	Mathematics, Statistics	MCQ	DCG	No Test in Afternoon	—————	—————

Table III: Information about Admission Tests for Junior Research Fellowships (JRFs) being offered in 2016

Subject	Centre	Code	Forenoon (10.30hrs to 12.30hrs)			Afternoon (14.00hrs to 16.00hrs)		
			Test Subject	Test Type	Test Code	Test Subject	Test Type	Test Code
Statistics	Kolkata	JSTK	Mathematics Statistics	<i>Short Answer</i>	STA	Mathematics Statistics	<i>Short Answer</i>	STB
	Delhi	JSTD						
	Bengaluru	JSTB						
	Chennai	JSTC						
Mathematics	Kolkata	JMTK	Mathematics	<i>Short Answer</i>	MTA	Mathematics	<i>Short Answer</i>	MTB
	Delhi	JMTD						
	Bengaluru	JMTB						
	Chennai	JMTC						
Quantitative Economics	Kolkata	JQEK	Mathematics	<i>Short Answer</i>	QEA	Economics	<i>Short Answer</i>	QEB
	Delhi	JQED						
Computer Science	Kolkata	JCSK	Mathematics	<i>MCQ</i>	MMA	Math/Stat/ Physics/ Electronics/ Electrical Engg/ Computer Sc	<i>Short Answer</i>	CSB
	Bengaluru	JCSB						
	Chennai	JCSC						
Quality, Reliability & Operations Research	Kolkata	JQRK	Mathematics	<i>MCQ</i>	MMA	Math/Stat/OR/ SQC/Reliability/ Quality Management & Systems	<i>Short Answer</i>	QRB
	Delhi	JQRD						
	Chennai	JQRC						
Physics & Appl Math	Kolkata	JPMK	Mathematics	<i>MCQ</i>	MMA	Mathematics/ Physics	<i>Short Answer</i>	PHB
Agriculture & Ecology	Kolkata	JA EK	Agriculture/ Ecology/Basic Statistics	<i>MCQ</i>	AEA	Agriculture/ Ecology/Basic Statistics	<i>Short Answer</i>	AEB
Geology	Kolkata	JG EK	Math/ Geomath	<i>MCQ</i>	GEA	Geology	<i>Short Answer</i>	GEB
Library & Information Science	Bengaluru	JLIB	Library & Information Science	<i>MCQ</i>	LIA	Library & Information Science	<i>Short Answer</i>	LIB
Development Studies	Bengaluru	JDSB	Sociology	<i>MCQ</i>	DSA	Sociology	<i>Short Answer</i>	DSB

SUBMISSION OF APPLICATION

Applications must be submitted by 11 **MARCH 2016**. Last date of making payment is **18 March, 2016**.

ADMIT CARD

After the applications are processed at ISI, the Admit Card for the Admission Test along with the Registration Number, will be generated, tentatively after April 04, 2016. Applicants will receive a link containing the above information in his/her account and will need to take printout of the Admit Card. In all subsequent correspondence, the applicant should quote the Registration Number without which no correspondence will be entertained.

The Admission Test will be held on Sunday, May 08, 2016 at a number of centres all over India.

NOTES

- Candidates selected for Junior Research Fellowships may be asked to join at a place other than the one opted for, if necessary.
- Candidates who fail to appear at the admission tests will not be considered for admission. On the basis of the performance in the tests and past academic records, a limited number of candidates will be asked to appear at an interview for final selection subject to verification of their eligibility with reference to original documents.
- **Any dispute concerning ADMISSIONS in 2016-2017 shall be settled in Kolkata subject to the jurisdiction of the Kolkata High Court.**

IMPORTANT DATES

Online Application	Starts: February 09, 2016 Ends: March 11, 2016
Payment of Application Fee	Starts: February 11, 2016 Ends: March 18, 2016
Issue of Admit Card/info booklet via post/portal	Starts: April 04, 2016
ISI ADMISSION TEST	May 08, 2016



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