INDIAN STATISTICAL INSTITUTE

Prospectus

2020−21

Contents

1   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 and 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 and diplomas in Statistics. In 1995, this Act was further amended, empowering the Institute to grant degrees and diplomas also in Mathematics, Quantitative Economics, Computer Science and 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, that are involved in activities related to Statistical Quality Control and Operations Research.

Most of the research and 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. ISI scientists working in the areas of Theoretical and Applied Statistics, Mathematics, Computer Science, Economics as well as Statistical Quality Control and Operations Research are located mainly in the Kolkata, Delhi, Bengaluru and Chennai campuses. In addition, scientists from other branches of natural and social sciences are posted at Kolkata, Chennai and Bengaluru,

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. Several 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 for recruitment in the past few years are: AIG, American Express, ANZ, Axis Bank, AB InVeb, AXA Life Insurance, BARC India, BCS Technology, BlackRock, Barclays Shared Services, Capital One, Citibank, Credit Suisse, Crisil, CIBIL, Citi Corp., Cummins India, Deloitte, Dr. Reddy's Lab, Dunia Finance LLC, Ernst & Young, Envestnet-Yodlee, FICO, Goldman Sachs, HSBC Technology & Services, IBM, ICICI, JP Morgan, KPMG, Mahindra Comviva, Mckinsey, Media.net, Metro, Microsoft, Narayana Hrudayalaya, Novartis, Nielsen, Petrabytes Corporation, RedBus, Reliance, Samsung, Standard Chartered, TCS Analytics, TCS Innovation Lab, United Health Group, Walmart Lab, ZS, Zendrive, 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 numerous 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: National Highway Authority of India, Tata Consultancy Services Ltd., EfD Secretariat at UGOT, Silicon Valley Com Foundation, Airport Authority of India, Networks Specified, Ericsson India, American Society for Quality India, IIT Madras, Szechenyi Istvan University, Hitachi India Pvt. Ltd., Bridge and Roof Company Ltd., Infosys Ltd., National Research University, Eastern Africa Statistical Training, State University of New York, London School of Economics, BRAC-University, Tata Institute of Social Sciences, City University of Hong Kong, University of Warwick, Yokohama National 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 and Applied Mathematics, 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 and 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 and South East Asia and the

Far East and from the Commonwealth countries of Africa. The Centre also offers various short-term courses in Statistics and related subjects.

2   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 and 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 and training school in Statistics and Probability with applications in natural and 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 and Irene Curie, Neils Bohr, AN Kolmogorov, PMS Blackett, JD Bernal, Joan Robinson and Genechi Taguchi. In recent times, the visit of Joseph E Stiglitz, James A Mirrlees, Eric S Maskin, Ei-Ichi Negishi and SRS Varadhan, the 2007 Abel Prize winner for his contributions to probability theory and 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

and Training Centre from 1962, Professor Mahalanobis thought of starting a centre of ISI at Bengaluru 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 July 26, 2008, and the North-East Centre at Tezpur, Assam, which was inaugurated on July 23, 2011, are expected to carry out research in theory and applications of Statistics in the new areas of natural and 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 and social sciences. Empowered by the Act to award degrees, the Institute introduced the Bachelor of Statistics (Honours) and 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 and methodological development, not merely in abstract formulation, but also in relation to concrete problems arising from natural and 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 and 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.

The following new programmes have been introduced during the past few years:

- a one-year **Postgraduate Diploma in Statistical Methods and Analytics [PGDSMA]** at the North-East centre of the Institute at Tezpur, Assam,

- a **two-year Master of Science in Quality Management Science [MS (QMS)]** which is being jointly conducted at Bengaluru and Hyderabad,

- a one-year **Postgraduate Diploma in Computer Applications [PGDCA]** at the Giridih branch of the Institute,

- a two-year **Postgraduate Diploma in Business Analytics [PGDBA]** at Kolkata jointly with Indian Institute of Management Calcutta and Indian Institute of Technology Kharagpur,

- a two-year **M Tech programme in Cryptology and Security [M Tech (CrS)]**.

In the forthcoming academic session (2020-21), a one-year **Postgraduate Diploma in Agricultural and Rural Management with Statistical Methods and Analytics [PGDARSMA]** is being introduced in the Giridih branch of the Institute.

3   Current Academic Programmes

Table I: Academic Programmes being offered by ISI in 2020

	Programme	Duration	Centre
Degree Programmes	B Stat (Hons)	3 years	Kolkata
	B Math (Hons)	3 years	Bengaluru
	M Stat	2 years	Delhi
	M Math	2 years	Kolkata
	MS (QE)	2 years	Delhi & Kolkata
	MS (LIS)	2 years	Bengaluru
	MS (QMS)	2 years	Bengaluru - Hyderabad
	M Tech (CS)	2 years	Kolkata
	M Tech (CrS)	2 years	Kolkata
	M Tech (QROR)	2 years	Kolkata
Diploma/ Certificate	Part-time Course in SQC[1]	6 months	Bengaluru, Chennai, Hyderabad
	Postgraduate Diploma in Statistical Methods & Analytics	1 year	Chennai & Tezpur[2]
	Postgraduate Diploma in Agricultural & Rural Management with Statistical Methods and Analytics	1 year	Giridih
	Postgraduate Diploma in Business Analytics[3] (jointly with IIT Kharagpur and IIM Calcutta)	2 years	Kolkata
Fellowships	Junior/Senior Research Fellowship (See below for details)	upto 6+1 years	Kolkata, Delhi Bengaluru, Chennai, Giridih

[1]For the academic year 2020-21, this programme will be notified separately, if offered.
[2]ISI North-East Centre
[3]Details about this programme are available at http://www.isical.ac.in/~pgdba

Research Programmes I

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

SUBJECT	CENTRE
Statistics	Kolkata, Delhi, Bengaluru, Chennai
Mathematics	Kolkata, Delhi, Bengaluru
Quantitative Economics	Kolkata, Delhi
Computer Science[1]	Kolkata, Bengaluru, Chennai
Quality, Reliability & Operations Research (QROR)	Kolkata, Bengaluru, Delhi, Chennai

Research Programmes II

The Institute also offers Junior 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 above, need to register with other Universities/Institutes for their Ph D degree.

These fellowships may not be offered every year and, if offered, not at all centres.

SUBJECT	CENTRE
Physics and Applied Mathematics	Kolkata, Bengaluru
Geology[†]	Kolkata
Biological Science*	Kolkata, Giridih
Sociology[†]	Kolkata
Development Studies	Bengaluru
Library & Information Science	Bengaluru

[†]Not being offered in 2020-21

*Not being offered at Giridih in 2020-21

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

4   Number of Seats

Table I: Number of Seats: Degree/Diploma Programmes (2020-21)

S.No.	Programme	Total Seat	GEN	OBC-NCL	SC	ST
1	Bachelor of Statistics Honours	50	25	14	7	4
2	Bachelor of Mathematics Honours	50	25	14	7	4
3	Master of Statistics	30*	15	8	5	2
4	Master of Mathematics	20*	10	5	3	2
5	Master of Science in Quantitative Economics (Delhi)	27	14	7	4	2
	Master of Science in Quantitative Economics (Kolkata)	18	9	5	3	1
6	Master of Science in Quality Management Science†	16	8	5	2	1
7	Master of Science in Library and Information Science	10	5	3	1	1
8	Master of Technology in Computer Science†	35	18	9	5	3
9	Master of Technology in Cryptology and Security†	20	10	5	3	2
10	Master of Technology in Quality Reliability and Operations Research†	25	13	7	4	1
11	Post-Graduate Diploma in Statistical Methods and Analytics (Chennai+Tezpur)	30**	15	8	5	2
12	Post-Graduate Diploma in Statistical Methods and Analytics (Tezpur)‡	15	8	4	2	1
13	Post-Graduate Diploma in Agricultural & Rural Management with Statistical Methods and Analytics	15	8	4	2	1

*Excludes the number of students getting direct admission from B.Stat./B.Math.

† An additional number of seats, not exceeding 10% of declared seats will be open to sponsored candidates.

** These include 15 seats at Chennai centre and 15 seats at Tezpur (ISI North-East centre)

‡ Reserved for domiciled candidates of the North-East states of India.

Three percent (3%) of seats will be horizontally reserved (that is, in each category (ST, SC, OBC-NCL and GEN)) for PwD (Persons with disabilities) candidates.

Table II: Number of Seats: Junior Research Fellowship (JRF) Programmes (2020-21)

S.No.	Programme	Total
1	JRF in Statistics	10
2	JRF in Mathematics	12
3	JRF in Quantitative Economics	5
4	JRF in Computer Science	21*
5	JRF in Quality Reliability and Operations Research	5
6	JRF in Physics and Applied Mathematics	5
7	JRF in Development Studies	2
8	JRF in Biological Science (Human Genetics)	1
9	JRF in Biological Science (Agricultural and Ecological Research)	1
10	JRF in Library and Information Science	3

*5 seats allocated to the R C Bose Centre for Cryptology and Security (RCBCCS)

The seats in the Junior Research Fellowship programmes are distributed over different locations of the institute. A selected candidate will be placed at one of the centres depending on the Admission Policy of the institute. Refer to the Selection policy for JRF for the reservation rule governing admission to JRF programmes.

5   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.

If a student is asked to discontinue from 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 website of the institute at http://www.isical.ac.in/~admission.

Institute will provide travel support to SC/ST candidates and economically backward candidates for attending the interview provided they are shortlisted for interview on the basis of written tests. The candidates will be provided sleeper class rail or bus fare by the shortest route for attending interview at the centre where the programme will be offered. A candidate must have an SC/ST certificate or a BPL card in order to be eligible for the support.

For admission to all its programmes, 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 - non creamy layer (OBC-NCL) categories and Persons with Disabilities (PwD) (collectively referred to as reserved categories). The details of reservation policy for admission to various academic programmes will be announced on the ADMISSION portal of the Institute.

Note: Syllabi as well as past years' questions/sample questions for the Admission tests of the academic programmes being offered by ISI in the current year can be downloaded from the ISI admission portal http://www.isical.ac.in/~admission.

6   Academic Programmes: Scope, Eligibility and Selection Procedure

Eligibility conditions, as mentioned below for each of the academic programmes, reflect only minimum requirements to apply for a particular programme. Merely satisfying the eligibility conditions does not guarantee selection into the programme.

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 an academic programme will be provisional pending the announcement of results. In such cases, however, their applications may be cancelled if the final examinations are not completed before **July 31, 2020**. The institute may decide to relax this date at its discretion.

6.1   Bachelor of Statistics (Honours) [B Stat (Hons)]

Scope   This **three-year** degree programme offers comprehensive instruction in the theory, methods and 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 and Mathematics, as well as Computer Science, Economics and allied fields, or take up careers as Statisticians in research institutions and scientific laboratories, government departments or industries. This programme is offered only at **Kolkata**.

Eligibility   In order to be eligible for admission to this programme, an applicant must have successfully completed 10+2 years of Higher Secondary Education (or its equivalent) with Mathematics and English as subjects.

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 will be called for interviews.

Written Test Waiver   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 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. The final list of candidates selected for admission is announced after completion of all the interviews.

6.2   Bachelor of Mathematics (Honours) [B Math (Hons)]

Scope   This **three-year** degree programme offers comprehensive instruction in basic Mathematics along with basic 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   Same as for the B Stat (Hons) programme.

Selection Procedure   Same as for the B Stat (Hons) programme.

Written Test Waiver   Same as for the B Stat (Hons) programme.

6.3   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** 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 subject, or
- a B Math degree from ISI, or

- a Post-Graduate Diploma in 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.

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 complete the first year in Kolkata. Other selected candidates complete the first year in either Delhi or Chennai as decided by the institute. The second year of the programme is conducted in Kolkata for all students.

6.4   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 or a BE/B Tech Degree with Mathematics as a subject, 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.

The admission tests will comprise multiple-choice questions in Mathematics in the first part and short-answer type questions in Mathematics in the second part. The questions will be on Mathematics at a level corresponding roughly to the Mathematics Honours/Major of Indian universities.

6.5   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 3-year Bachelor's degree in any discipline with Mathematics as a subject at the intermediate (10+2) level.

Selection Procedure   Selection of candidates to this programme will be based on performance in written tests and subsequent interview. The written admission tests will comprise multiple-choice and short answer type questions in both Economics and Mathematics at the undergraduate level.

6.6   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 programme 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 Project work in the fourth semester will be at a centre of the institute depending on the location of the project assigned to the student.

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 in any discipline.

Selection Procedure   Selection of candidates to this programme, including the sponsored ones, will be based on performance in written tests and subsequent interview. The written admission tests will comprise multiple-choice and/or descriptive questions in Mathematics at the undergraduate level.

Sponsorship of Candidates   There is a provision for **sponsorship** of candidates for this programme by government, semi-government and public sector undertakings. General eligibility criteria and qualifying degree for sponsored candidates are the same as those for the regular (non-sponsored) candidates. However, the following **clauses** are applicable in the case of sponsored candidates:

1. A sponsored candidate must be from government/ semi-government/ government-aided, both national and international. Self-sponsored candidates are not eligible to apply.

2. Sponsored candidates will have to pay a tuition fee of Rs. 50,000 per semester. They are not eligible for any scholarship/financial support from the Institute.

3. A sponsored candidate must have been in service of the sponsoring organization for at least two years as on the date of admission to the programme. This two years of service experience must have been gained by the candidate after acquiring the requisite qualifying degree of the programme into which the candidate is seeking admission.

4. The sponsoring organization must specifically undertake to pay the necessary tuition fees to the Institute and to relieve the candidate to pursue the programme for its full duration.

5. A certificate from the sponsoring organization, to the effects of points 3 and 4 above, must be provided by the candidate at the time of applying for admission to the corresponding programme.

Selection procedure for sponsored candidates: Sponsored candidates, like regular candidates, will be selected through written tests and interview. However, the qualifying score in written tests and interview for these candidates will be determined by relaxing the qualifying score for the General (unreserved) category by 10%.

The number of seats to be allocated to sponsored candidates in a given programme is supernumerary, subject to a maximum of 10% of the total number of seats for the programme.

6.7   Master of Science in Library and Information Science [MS (LIS)]

Scope   This is a **two-year** advanced programme in Library and 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 and 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 and information centres;

- design and development of information systems;

- contributing to the discipline of Library and Information Science in terms of research and teaching.

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

Eligibility In order to be eligible for admission to this programme, an applicant must have a three-year Bachelor's degree in any discipline.

Selection Procedure Selection of candidates will be based on performance in written tests and subsequent interview.

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

- a four-year B-Tech/B.E. (or equivalent) degree in any stream or,

- a master's degree in any subject and have passed Mathematics at the 10+2 level.

Selection Procedure A candidate is admitted to this programme through written tests and interview.

The written test consists of two tests:

 (i.) a multiple choice type test on Mathematics at the B.Sc. (pass) level

(ii.) a subjective test consisting of two parts, the candidate having to answer any one part:

Group A: Mathematics at the B.Sc. (pass) level

Group B: Computer Science at B.E./B. Tech. level

Written Test Waiver   The written test is be waived for candidates with a valid GATE score above a threshold, to be decided by the admission committee each year. A student who applies for admission and meets the announced threshold for GATE score will be called directly for the interview. Candidates who obtain a waiver in the written tests will be assigned a score in the written test based on the GATE score. **These candidates are required to apply, like all other candidates, in the prescribed application form.**

Sponsorship of candidates There is a provision for **sponsorship** of candidates for this programme by government, semi-government and public sector undertakings. General eligibility criteria and qualifying degree for sponsored candidates are the same as those for the regular (non-sponsored) candidates. Other terms and conditions are identical to those for sponsored candidates for the MSQMS programme (refer to clauses (1) - (5) under Section 6.6, page no. 20).

6.9   Master of Technology in Cryptology and Security [M Tech (CrS)]

Scope   This is a **two year** programme offered at **Kolkata**. The programme is designed to impart in-depth theoretical and practical knowledge in the area of cryptology and information security. It is designed to provide the basic background in mathematics, statistics and computer science followed by specialized instructions on various theoretical and practical aspects of the field. The students on successful completion of the programme, may take up

- a professional career in a industry/government organization which specializes in information security.

- an academic career to further study and research in theoretical and practical aspects of cryptology, information security and related disciplines.

Eligibility   Same as for the M Tech programme in Computer Science.

Selection Procedure   Same as for the M Tech programme in Computer Science.

Written Test Waiver   Same as for the M Tech programme in Computer Science.

Sponsorship of candidates   Same as for the M Tech programme in Computer Science.

6.10   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 Statistical Quality Control, Reliability, Operations Research, and Quality 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 and sufficient theory to understand the principles involved in the application and to inculcate 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, financial sector, 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   In order to be eligible for admission to this programme, an applicant must have

 (i) a Master's Degree in Statistics with Physics and Chemistry at the (10+2) level; or

 (ii) a Master's Degree in Mathematics with Statistics as a subject at undergraduate or post-graduate level, and Physics and Chemistry at the (10+2) level; or

(iii) a BE/B Tech degree or any other qualification considered equivalent (such as AMIE).

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 programme, valid GATE score is not necessary, and candidates with valid GATE scores also must take the written tests.

Sponsorship of candidates   There is a provision for **sponsorship** of candidates for this programme by government, semi-government and public sector undertakings. General eligibility criteria and qualifying degree for sponsored candidates are the same as those for the regular (non-sponsored) candidates. Other terms and conditions are identical to those for sponsored candidates for the MSQMS programme (refer to clauses (1) - (5) under Section 6.6, page no. 20).

The Admission Test is conducted in two sessions (forenoon and afternoon):

Session 1: a multiple-choice type of test in Mathematics at the undergraduate level;

Session 2: a 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 and Electronics Engineering and Engineering Drawing. Candidates must answer questions from both the sections.

6.11   Postgraduate Diploma in Statistical Methods and Analytics [PGDSMA]

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**. This year it is offered at **Chennai** and the **ISI North-East Centre, Tezpur**.

This programme is open to candidates from all over India. However, **Fifty percent (50%) of the total number of seats at ISI North East (Tezpur) centre is reserved for the students domiciled in 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 who are domicile of North-Eastern states of India.

Eligibility   In order to be eligible for this program one must have one of the following:

- a three-year Bachelor's Degree in any discipline with Mathematics as a subject;

- a BE/B Tech degree or any other qualification considered equivalent (such as AMIE).

In order to be considered for admission to this programme at the ISI North-East Centre (Tezpur) as a domiciled candidate, it is mandatory to have a valid certificate of domicile in one of the North-Eastern states of India from a competent authority.

Selection Procedure Selection is based on the performance in written test and interview. The admission test will comprise multiple-choice questions on Basic Mathematics.

6.12 Postgraduate Diploma in Agricultural and Rural Management with Statistical Methods and Analytics [PGDARSMA]

Scope The programme is intended to provide students with comprehensive training in agricultural farm management, statistical methods and applications using R, computer operation and programming, agricultural production and operations management, agribusiness and rural management. This unique program is so designed that on successful completion, the students will be able to take up jobs in rural development organizations under Central and State governments, national and multinational companies involved in agro-processing and agricultural business operation or supply chain management, international and national level NGOs, development projects funded by government and non-government organizations, agricultural and livelihood related projects, and rural banking sector amongst others.

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 programme.

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

- a three/four-year Bachelor's Degree in any discipline with Mathematics/Statistics as a subject studied at least at the intermediate (10+2) level as a subject.

Selection Procedure Selection is based on the performance in written test and interview. The admission test will comprise multiple-choice questions on Mathematics (up to 12th standard), Logical Reasoning, as well as English Grammar and Comprehension.

6.13 Postgraduate Diploma in Business Analytics [PGDBA]

Scope The Post Graduate Diploma in Business Analytics (PGDBA) – jointly offered by ISI, IIT Kharagpur and IIM Calcutta – 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, specially designed to create business analytics professionals employable by leading Indian and foreign firms. Students successfully graduating from this programme will have options to join organizations working in the area of analytics, or pursue doctoral or other advanced studies in this area.

See http://www.isical.ac.in/~pgdba/ for further details.

6.14   Junior Research Fellowships (JRF)

6.14.1   JRF 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 6+1 years.

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

SUBJECT	CENTRE
Statistics	Kolkata, Delhi, Bengaluru, Chennai
Mathematics	Kolkata, Delhi, Bengaluru
Quantitative Economics	Kolkata, Delhi
Computer Science[2]	Kolkata, Bengaluru, Chennai
Quality, Reliability & Operations Research (QROR)	Kolkata, Bengaluru, Delhi, Chennai

Eligibility

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

- an M Stat degree from ISI, or

- an MA/M Sc or equivalent degree in Statistics.

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

- an M Stat/ M Math degree from ISI, or

- an MA/ M Sc or equivalent degree in Mathematics, or

- an ME/ M Tech degree or equivalent with Mathematics as a subject.

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

- a Master's degree in any discipline with Economics/ Mathematics/ Statistics as a subject at the undergraduate or postgraduate level.

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

- an ME/ M Tech or equivalent Master's degree in Electronics/ Telecommunication/ Radio Physics/ Computer Science/ Electrical Engineering/ Microwave Communications/ Information Technology/ Bioinformatics/ Biotechnology with Mathematics as a subject at the undergraduate or postgraduate level, or

- an M Stat/ M Sc/ MCA/ MA or equivalent Master's degree in Physics/ Mathematics/ Applied Mathematics/ Statistics/ Electronic Sciences/ Computer Science/ Atmospheric Science/ Information Technology/ Bioinformatics/ Biotechnology with Mathematics as a subject at the undergraduate or postgraduate level.

Quality, Reliability & Operations Research (QROR)   In order to be eligible for admission to this programme, an applicant must have

- an M Tech/ ME/ MS/ M Phil or equivalent degree in Quality/ Reliability/ Operations Research, or

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

- an M Stat/ M Sc/ MA or equivalent degree in Mathematics/ Statistics/Physics with Mathematics as a subject at the undergraduate or postgraduate level.

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 Written Test and interview.

Written Test Waiver   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 backpaper 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 aforementioned 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. The institute may conduct a separate equivalent test in December 2020 - January 2021. If any such test is held, it will be advertised in the website of the Institute.

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, Agriculture, 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: Algebraic Topology, Differential Topology, Dynamical systems, Algebraic Geometry, Commutative Algebra and Affine Algebraic Geometry, Functional Analysis, Geometry of Banach Spaces, Spectral Theory of Differential Operators, Non-commutative Geometry, Harmonic Analysis, Wavelet Analysis,

Number theory. 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 Giga-scale 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: 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.

Statistics: Bayesian Statistics, Design of Experiments, Survey sampling.

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.

Quality, Reliability & Operations Research (QROR): Statistical Process Control, Reliability and Six sigma.

CHENNAI

Statistics: Quantitative Finance, Reliability, Survival Analysis.

Mathematics: 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.

6.14.2   Research Fellowships (JRF) in Other Subjects

Scope   The Institute also offers Junior 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. 26, 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 6+1 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:

(a) Physics and Applied Mathematics

Areas: **Physics and Applied Mathematics**
Eligibility: an M Sc degree in Physics or an M Sc degree in Mathematics or equivalent.

(b) Biological Science

Area: **Agricultural and Ecological Research**
Eligibility: M.Sc. or equivalent degree in Botany / Biochemistry / Microbiology / Biotechnology / Life Sciences

Area: **Human Genetics**
Eligibility: M.Sc. or equivalent degree in Biochemistry / Biotechnology / Genetics / Molecular Biology / Life Sciences / Zoology.

(c) Development Studies

Areas: 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, Economics, Agricultural Economics, or any equivalent degree.

(d) Library and Information Science

Area: **Library and Information Science**
Eligibility: MS (LIS) awarded by ISI or Associateship in Documentation and Information Science (=ADIS, awarded by ISI or NISCAIR/INSDOC) or its equivalent degree (such as Master's degree in Library and Information Science from any Indian/Foreign University).

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

SUBJECT	CENTRE
Physics and Applied Mathematics	Kolkata, Bengaluru
Development Studies	Bengaluru
Biological Science	Kolkata
Library & Information Science	Bengaluru

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 Written Tests and interview. Past academic records may also be taken into consideration[3].

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, are also required to clear the ISI JRF admission test or an equivalent test conducted by the relevant JRF selection committee of the institute for submitting the doctoral thesis in ISI for a PhD degree. **No equivalent test will be conducted for such awardees in the academic session 2020-21.**

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[3]For an applicant receiving education outside of India, whether the applicant satisfies the eligibility criteria for a programme will be decided on a case-by-case basis.

7   Doctoral Degrees

7.1   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 in 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.

7.2   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.

8   Other Information for Prospective Students

For all the regular degree programmes, each academic year is divided into two semesters separated by a short break. The first semester (Semester I) for all the programmes usually starts in July/August and ends in November/December. The second semester (Semester II) starts in January and, for all the programmes 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 June, after summer training for M Tech (CS) and field training for M Tech (QROR) and MS (QMS). Classes are held on weekdays (Monday to Friday) during designated class hours.

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 Agricultural & Rural Management with Statistical Methods and Analytics*, receive stipends, fellowships and book/contingency 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 only. They are renewed every semester 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 programme have to refund the stipend/contingency grant received, if any. At the end of each semester, prizes are also awarded for outstanding performance in examinations.

PROGRAMME	Stipend/ Fellowship per month (Rs.)	Contingency Grant per year (Rs.)
B Stat (Hons)/B Math (Hons)	5000	5000
M Stat/M Math/MS(QE)/ MS(LIS)/MS(QMS)	8000	8000
M Tech (CS)/M Tech (QROR)	12400	8000
M Tech (CrS)	8000†	8000
Post-Graduate Diploma in Statistical Methods and Analytics	3000 *	3000 *
Junior Research Fellowship (JRF)	31000 + HRA as per rules	20000
Senior Research Fellowship (SRF)‡	35000 + HRA as per rules	20000

†Likely to be enhanced to Rs. 12400 subject to the approval of the Ministry

*Only for students domiciled in the North-Eastern States of India

‡After two years as JRF

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, 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.

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 and Hyderabad. The campus at Giridih also has rudimentary hostel facilities. A nominal rent is charged per month for accommodation. Students are responsible for payment of food charges. 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.

Students joining the PGDSMA programme at ISI Chennai and at the ISI NE Centre (Tezpur) in 2020-21 will have to make their own arrangements for accommodation since the Institute will not be able to provide hostel facilities.

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 (CrS), M Tech (QROR) and other degree, diploma/ certificate programmes of the Institute and those having the Ph D degree of the Institute either get opportunities to join research programs in India and abroad, or get placed in attractive positions in the industry or government departments. The master degree programs in ISI have close to 100% placement record. 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 ISI North East centre.

9   Application Procedure

Application to the programmes being offered by Indian Statistical Institute in the academic year 2020-21 must be done online through the Indian Statistical Institute (ISI) Admission Portal the link to which is available at http://www.isical.ac.in/~admission.

The applicant must initially register at the ISI Application Portal through http://www.isical.ac.in/~admission). An account will be created for the applicant in the portal, through which s/he can conveniently fill up the application form and also make payment of the application fee after submission of the form.

When applying online for a particular programme, an applicant will also need to select one of the locations where the programme is being offered. This location is considered to be the first preference of the candidate. However, the candidate, if selected at the end of the selection process, may not be always be offered a seat at the location of first preference. The offered location will be determined by the rank of the candidate in the Merit list and the availability of seats at different locations.

After completion of application at the ISI Application Portal, the applicant will be directed to the payment gateway for fee payment.

To complete the online application process successfully without any problems, the applicant is advised to have the following items ready:

For Registration on the application portal

- Email ID
- Mobile number

For completing the online application form

- Clear digital/ scanned colour photograph taken against light background
  - Passport-size (4.5 cm $\times$ 3.5 cm)
  - Face coverage approximately 60%.
  - Permissible image size: 100-150 KB
  - Only jpeg, jpg formats are allowed.
- Scanned signature
  - Signature must be on white background with black/ blue ink pen.
  - Signature image must be cropped to a 3 cm $\times$ 7 cm box.
  - Permissible image size: 50-100 KB
  - Only jpeg, jpg formats are allowed.

- Scanned copies of

    - the first and last pages of passport in case nationality is not INDIAN
    - marksheets/ grade cards for all school/ college/ university examinations taken, starting with the 10th standard or equivalent
    - valid caste (SC/ ST/ OBC-NCL) and/or disability certificates if and as applicable
      (**Note: OBC-NCL certificates issued prior to April 1, 2019 will not be considered to be valid. However, OBC-NCL certificates issued by any competent authority and valid on the date of application will be acceptable.**)

    For all scanned documents to be uploaded, please ensure that

    - **the image size is less than 200 KB;**
    - **scan is done in 100 dpi only;**
    - **the format of the image file is any one of the following:** *jpeg, jpg, bmp, pdf.*

- Employment details (non-mandatory) if applicable

    - name of employer(s)
    - corresponding duration(s) of employment
    - corresponding designation(s)/ position(s)
    - corresponding nature of work/experience including publications (if applicable)

- If seeking waiver from written tests, scanned copy of

    - INMO Certificate issued by NBHM (**for B.Stat./B.Math.**)
    - GATE score card (for **M.Tech. (CS/CrS)**)

For payment of application fee

- Credit Card/ Debit Card/ Net Banking Details as required.

Detailed guidelines for filling the online application form are available at the application portal.

Overseas applicants   Applicants residing overseas, like all other applicants, must apply online. However, they must take the Admission Test at one of the Test centres located in various towns and cities all over India (see Table 1, page no. 40). In addition, such applicants are also requested to **share their Application ID by email** to dean@isical.ac.in with subject **Admission 2020-21: Overseas Application** immediately after successful submission of the application, and certainly no later than **March 20, 2020**.

Application Fee

- Rs 1250.00 for all male applicants in the general category,

- Rs. 750.00 for all female candidates in the general category, and

- Rs 625.00 for applicants belonging to SC/ST/OBC-NCL/Persons with Disabilities (PwD) categories.

Each applicant will have to pay in addition a fixed amount towards bank charges.

Mode of payment   The application fee can be paid through the ISI application portal after submission of the application form, using Debit Card, Credit Card or Net Banking. Additional bank charges will be applicable over and above the application fee. Within twenty-four hours of payment of the application fee, the applicant should receive payment confirmation by email from . Confirmation of the payment status can also be done by checking the APPLICATION STATUS after logging in to your account in the ISI Application Portal.

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 academic programme 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 an academic programme will be provisional pending the announcement of results. In such cases, however, their applications may be cancelled if the final examinations are not completed before July 1, 2020. The institute may decide to relax this date at its discretion.

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

Submission of application   Applications must be submitted by **March 06, 2020**. Last date of making payment is **March 10, 2020**.

Admit Card   The Admit Card(s) for the Admission Test along with the (unique) Registration Number will be generated around **April 20, 2020**. There will be a separate admit card for each test (forenoon and afternoon OR only forenoon) an applicant is required to take. Once the admit card(s) is/are generated, applicants will be notified by e-mail, after which they can download the same from the Dashboard of

their account at the application portal. They will be required to carry hard copies of the admit card(s) to the test centres on the day of the Admission Test.

In all subsequent correspondence, the applicant should quote the Registration Number without which no correspondence will be entertained.

The following tables contain useful information pertaining to the ISI Admission Test 2020.

Table 1: Codes for ISI Admission Test Centres in 2020

Serial no.	City	Centre Code	Serial no.	City	Centre Code	Serial no.	City	Centre Code
1	Agartala	AG	23	Dhanbad	DB	45	Nagpur	NG
2	Agra	AR	24	Dibrugarh	DG	46	Naharlagun	NH
3	Ahmedabad	AD	25	Durgapur	DP	47	Nellore	NL
4	Aizwal	AZ	26	Ernakulam	ER	48	New Delhi	DH
5	Ajmer	AJ	27	Gangtok	GT	49	Noida	ND
6	Alipurduar	AP	28	Gurgaon	GG	50	Patna	PT
7	Allahabad	AH	29	Guwahati	GH	51	Pune	PU
8	Amritsar	AM	30	Hyderabad	HY	52	Purulia	PL
9	Asansol	AS	31	Imphal	IM	53	Raipur	RP
10	Bankura,	BK	32	Indore	ID	54	Ranchi	RN
11	Bengaluru (Bangalore)	BG	33	Jaipur	JP	55	Ranigunj	RJ
12	Berhampur-Ganjam	BE	34	Jamshedpur	JS	56	Rourkela	RR
13	Bhopal	BP	35	Kalyani	KL	57	Shillong	SL
14	Bhubaneswar	BH	36	Kanpur	KN	58	Silchar	SC
15	Bilaspur	BL	37	Kohima	KM	59	Siliguri	SG
16	Birbhum	BB	38	Kolkata	CC	60	Tezpur	TZ
17	Chandigarh	CH	39	Lucknow	LN	61	Trichy	TR
18	Chennai	CN	40	Malda	MD	62	Trivandrum	TV
19	Coimbatore	CM	41	Midnapore	MN	63	Vadodara	VD
20	Coochbehar	CB	42	Mumbai	MB	64	Varanasi	VN
21	Cuttack	CT	43	Murshidabad	MU	65	Vijayawada	VJ
22	Dehradun	DN	44	Muzaffarpur	MZ	66	Visakhapatnam	VP

Table 2: Information about Admission Tests for Programmes being offered in 2020

Programme	Code	Forenoon 10:30 hrs to 12:30 hrs			Afternoon 14:00 hrs to 16:00 hrs		
		Test Subject	Test Type	Test Code	Test Subject	Test Type	Test Code
B Stat	BSTK	Math	MCQ	UGA	Math	Descriptive	UGB
B Math	BMTB	Math	MCQ	UGA	Math	Descriptive	UGB
M Stat	MSTD	Math, Stat	MCQ	PSA	Math, Stat	Descriptive	PSB
M Math	MMTK	Math	MCQ	PMA	Math	Descriptive	PMB
MS(QE)	MQEK (Kolkata) MQED (Delhi)	Math, Eco	MCQ	PEA	Math, Eco	Descriptive	PEB
MS (QMS)	MQMY	Math	MCQ	QMA	Math	Descriptive	QMB
MS (LIS)	MLIB	Quantitative and Reasoning Ability	MCQ	PLA	Essays and English Comprehension	Descriptive	PLB
M Tech (CS)	MCSK	Math	MCQ	PCA	Math/ Comp Sc	Descriptive	PCB
M Tech (CrS)	MCYK	Math	MCQ	PCA	Math/ Comp Sc	Descriptive	PCB
M Tech (QROR)	MQRK	Math	MCQ	PQA	Stat/Prob/ Math/Engg	Descriptive	PQB
PG Diploma in Statistical Methods & Analytics	DSTC (Chennai) DSTT (Tezpur)	Math	MCQ	DST	No Test	–	–
PG Diploma in Agri. Rural Mgmt. Stat. Methods & Anal.	DARG	Math, English, Logical Reasoning	MCQ	DRA	No Test	–	–

The meaning of the short forms used in the column of 'Test Subject' are – Math: Mathematics, Stat: Statistics, Eco: Economics, Eng. Lang.: English Language, Phys: Physics, Engg: Engineering, Tech: Technology, Comp Sc: Computer Science, Prob: Probability.

Table 3: Information about Admission Test for Junior Research Fellowships (JRFs) being offered in 2020

Programme	Centre	Code	Forenoon 10:30 hrs to 12:30 hrs			Afternoon 14:00 hrs to 16:00 hrs		
			Test Subject	Test Type	Test Code	Test Subject	Test Type	Test Code
Statistics	Kolkata	JSTK	Math, Stat	Descriptive	STA	Math, Stat	Descriptive	STB
	Delhi	JSTD						
	Bengaluru	JSTB						
	Chennai	JSTC						
Mathematics	Kolkata	JMTK	Math	Descriptive	MTA	Math	Descriptive	MTB
	Delhi	JMTD						
	Bengaluru	JMTB						
Quantitative Economics	Kolkata	JQEK	Math	Descriptive	QEA	Eco	Descriptive	QEB
	Delhi	JQED						
Computer Science	Kolkata	JCSK	Math	MCQ	CSA	Math, Stat, Phys Electro, Elect Engg Comp Sc	Descriptive	CSB
	Bengaluru	JCSB						
	Chennai	JCSC						
Quality Reliability & Operations Research	Kolkata	JQRK	Math	MCQ	QRA	Math, Stat, OR, SQC, Reliability, Quality Management & Systems	Descriptive	QRB
	Delhi	JQRD						
	Chennai	JQRC						
	Bengaluru	JQRB						
Physics & Applied Mathematics	Kolkata	JPMK	Math	MCQ	PHA	Math, Phys	Descriptive	PHB
	Bengaluru	JPMB						
Biological Science (Agri. & Eco. Res.)	Kolkata	JAEK	Agri Science Basic Stat	MCQ	AEA	Agri Science Basic Stat	Descriptive	AEB
Biological Science (Human Genetics)	Kolkata	JHGK	Biochem, Biotech Genetics, Mol Bio Life Sc, Zool	MCQ	HGA	Biochem, Biotech Genetics, Mol Bio Life Sc, Zool	Descriptive	HGB
Development Studies	Bengaluru	JDSB	Develop Stud Economics Agri Econ	MCQ	DSA	Develop Stud Economics Agri Econ	Descriptive	DSB
Library & Information Science	Bengaluru	JLIB	Lib & Info Sc	MCQ	LIA	Lib & Info Sc	Descriptive	LIB

The meaning of the short forms used in the column of 'Test Subject' are – Math: Mathematics, Stat: Statistics, Eco: Economics, Phys: Physics, Elect Engg: Electrical Engineering, Electro: Electronics, Comp Sc: Computer Science, Prob: Probability, Agri Science: Agricultural Science, Lib & Info Sc: Library & Information Science, Biochem: Biochemistry, Biotech: Biotechnology, Mol Bio: Molecular Biology, Life Sc: Life Science, Zool: Zoology, Develop Stud: Development Studies, Agri Econ: Agricultural Economics

The Admission Test will be held on Sunday, May 10, 2020, 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 written tests, shortlisted 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 2020-21 shall be settled in Kolkata subject to the jurisdiction of the Kolkata High Court.**

IMPORTANT DATES		
Online Application	Starts:	**February 14, 2020**
	Ends:	**March 06, 2020**
Payment of Application Fee	Starts:	**February 14, 2020**
	Ends:	**March 10, 2020**
Issue of Admit Card	Starts:	**April 20, 2020**
ISI ADMISSION TEST	**MAY 10, 2020**	