भिन्नेष्वैक्यस्य दर्शणम्

PROSPECTUS 2022-23

STATISTICAL
INDIAN · INSTITUTE
भिन्नेष्वैक्यस्य दर्शनम्
UNITY IN DIVERSITY

INDIAN STATISTICAL INSTITUTE
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List of Abbreviations

B Stat	Bachelor of Statistics
B Math	Bachelor of Mathematics
M Stat	Master of Statistics
M Math	Master of Mathematics
M Tech	Master of Technology
PGD	Postgraduate Diploma
JRF	Junior Research Fellowships
SRF	Senior Research Fellowships
CS	Computer Science
CrS	Cryptology and Security
QROR	Quality, Reliability & Operations Research
Math	Mathematics
Stat	Statistics
Eco	Economics
Engg	Engineering
Comp Sc	Computer Science
Prob	Probability
Phys	Physics
Elect Engg	Electrical Engineering
Electro	Electronics
Agri Science	Agricultural Science
Lib & Info Sc	Library & Information Science
OR	Operations Research
SQC	Statistical Quality Control
QE	Quantitative Economics
QMS	Quality Management Science
LIS	Library and Information Science
PGDSMA	Postgraduate Diploma in Statistical Methods and Analytics
PGDARSMA	Postgraduate Diploma in Agricultural and Rural Management with Statistical Methods and Analytics
PGDBA	Postgraduate Diploma in Business Analytics
PGDAS	Postgraduate Diploma in Applied Statistics

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 nine 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, Tezpur 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 centre at Chennai is 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, Amazon, 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, Wells Fargo, 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 R.C. Bose Centre for Cryptology and Security (RCBCCS) was established in ISI in the year 2012 with the aim of promoting interdisciplinary research in Mathematics, Computer Science and Statistics towards furtherance of teaching, research as well as training and development in Cryptology and Cyber Security. Following a request from the National Security Council Secretariat, an M.Tech. programme in Cryptology and Security was started at this Centre in 2018

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

- a one-year **Postgraduate Diploma in Agricultural and Rural Management with Statistical Methods and Analytics [PGDARSMA]** at the Giridih branch of the Institute.

In the academic session (2022-23), a one-year **Postgraduate Diploma in Applied Statistics [PGDAS]**, is being introduced, which will be **provided online through Coursera.**

3   Current Academic Programmes

Table 1: Academic Programmes being offered by ISI in 2022-23

	Programme	Duration	Centre
Bachelors Degree Programmes	B Stat (Hons)	3 years	Kolkata
	B Math (Hons)	3 years	Bengaluru
Masters Degree Programmes	M Stat	2 years	Delhi - Kolkata
	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 Programmes	Part-time Course in SQC[1]	6 months	Bengaluru, Chennai, Hyderabad
	Post-graduate Diploma in Statistical Methods & Analytics	1 year	Chennai & Tezpur[2]
	Postgraduate Diploma in Agriculture & 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
	Postgraduate Diploma in Applied Statistics	1 year	Provided online through Coursera
Research Fellowships Programmes	Junior/Senior Research Fellowship (see below for details)	upto 6+1 years	Kolkata, Delhi, Bengaluru Chennai, Giridih

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[1]For the academic year 2022-23, this programme will be notified separately, if offered.
[2]ISI North-East Centre.
[3]Details about this programme are available at https://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 (QROR).

Table 2: Locations of Research Programmes I: 2022-23

SUBJECT	CENTRE
Statistics	Kolkata, Delhi, Bengaluru, Chennai
Mathematics	Kolkata, Delhi, Bengaluru
Quantitative Economics	Kolkata, Delhi
Computer Science[4]	Kolkata, Bengaluru, Chennai
Quality, Reliability & Operations Research (QROR)[5]	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 subjects 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.

Table 3: Locations of Research Programmes II: 2022-23

SUBJECT	CENTRE
Physics and Applied Mathematics	Kolkata, Bengaluru
Geology	Kolkata
Biological Science	Kolkata, Giridih
Library & Information Science	Bengaluru

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[4]A JRF (CS) assigned to Bengaluru or Chennai Centre may have to go to Kolkata for completing the necessary coursework.

[5]A JRF (QROR) assigned to Bengaluru, Delhi or Chennai Centre may have to go to Kolkata for completing the necessary coursework.

4　Number of Seats

The number of seats allocated for the year 2022-23 to each category of applicants to different pro-grammes of the Institute is indicated in the two following tables. These numbers are in accordance with the Reservation policy of the Institute. The allocation of candidates to these seats will take place according to the Admissions rules of the Institute for JRF and non-JRF applicants.

Table 4: Number of seats: Non-JRF programmes (2022-23)

Sl.No.	Programme	Total		GEN	OBC-NCL	SC	ST	EWS‡	GEN-PwD
1	B Stat		63	23	17	9	5	6	3
2	B Math		63	23	17	9	5	6	3
3	M Stat		38*	14	10	6	3	3	2
4	M Math		24*	9	6	4	2	2	1
5	MSQE	Delhi	35	13	9	5	3	3	2
		Kolkata	21	8	6	3	1	2	1
6	MS QMS †		20	7	5	3	2	2	1
7	MS LIS		12	4	3	2	1	1	1
8	M Tech CS†	ISI Test Channel	30	11	8	5	2	3	1
		GATE Channel§	15	6	4	2	1	1	1
9	M Tech CrS †	ISI Test Channel	20	7	5	3	2	2	1
		GATE Channel§	5	3	1	1			
10	M Tech QROR †		32	12	9	5	2	3	1
11	PG DSMA	Chennai	25	9	7	4	2	2	1
		Tezpur	18	7	5	3	1	1	1
		Domicile††	18	7	5	3	1	1	1
12	PG DAS	(Online)	30**	12	8	4	2	3	1
13	PG DARSMA		18	7	5	3	1	1	1

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

**Excludes the number of students admitted through Coursera and not getting tuition waiver.

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

§The GATE Channel seats in a particular category, if unfilled, may be converted to ISI Test Channel seats.

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

‡EWS seats will remain vacant in the absence of eligible candidates from the given category.

Table 5: Number of seats: Junior Research Fellowship (JRF) programmes (2022-23)

S.No.	Programme	Total
1	JRF in Statistics	12
2	JRF in Mathematics	10
3	JRF in Quantitative Economics	10
4	JRF in Computer Science	20*
5	JRF in Quality Reliability and Operations Research	2
6	JRF in Physics and Applied Mathematics	6
7	JRF in Geology	2
8	JRF in Biological Science (Agricultural and Ecological Research)	1
	JRF in Biological Science (Human Genetics)	1
9	JRF in Library and Information Science	1

* Including 2 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 rules of the institute for JRFs. These seats exclude the number of candidates who may be selected from awardees of external junior research fellowships in the above disciplines.

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 as applicable under the Selection Policy. 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 Final Rank-ordered Merit Lists as well as results of various rounds of counselling for admission (see Selection Policy as well as Admission Rules) are announced on the website of the institute at https://www.isical.ac.in/~admission.

In case of interviews (if applicable), the Institute will provide travel support to SC/ST candidates and economically backward candidates for attending the interview provided they are shortlisted for interview. 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, Persons with Disabilities (PwD) and Economically Weaker Sections (EWS) (collectively referred to as reserved categories). The details of reservation policy for admission to various academic programmes will be announced on the website of the institute at https://www.isical.ac.in/~admission.

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 https://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, 2022**. 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 will have to appear for two written tests comprising multiple-choice type and descriptive questions in Mathematics at the 10+2 level. Please refer to the Selection Policy for details.

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 that of the B Stat (Hons) programme.

Selection Procedure   Same as that of 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 offered at **Delhi** and **Kolkata**. Students without B Stat background do their first year at **Delhi**.

Eligibility   In order to be eligible for admission to this programme, an applicant must have a Bachelor's degree of three or more years' duration, in any discipline.

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, please refer to the Selection Policy for details of the selection process.

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. Freshly selected candidates complete the first year in Delhi. 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 years at Bengaluru or Kolkata. For the batch admitted in 2022 it is being offered at **Kolkata**.

Eligibility   In order to be eligible for admission to this programme, an applicant must have a Bachelor's degree of three or more years' duration, in any discipline.

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, please refer to the Selection Policy for details of the selection process.

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 Bachelor's degree of three or more years' duration, in any discipline.

Selection Procedure   Please refer to the Selection Policy for details of the selection process.

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 Bachelor's degree of three or more years' duration, in any discipline.

Selection Procedure   The written admission tests will comprise multiple-choice and/or descriptive questions in Mathematics at the undergraduate level. Please refer to the Selection Policy for details.

Sponsored Candidates   There is a provision for **sponsored candidates** (by government, semi-government and public sector undertakings) for this programme. 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: For sponsored candidates, the procedure is the same as that for regular candidates. However, the qualifying scores for these candidates at each stage of selection (see Selection Policy) 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 Bachelor's degree of three or more years' duration, in any discipline.

Selection Procedure   Please refer to the Selection Policy for details of the selection process.

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　The written tests consist of a multiple choice type test on Mathematics at the B.Sc. (pass) level, and 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

Please refer to the Selection Policy for details of the selection process.

GATE Channel of Admission　Candidates with a valid GATE score may be shortlisted for a separate interview on the basis of that score, for eventual selection through the GATE channel. These candidates are required to apply, like all other candidates, in the prescribed application form. Please see Selection Policy for details.

Sponsored candidates There is a provision for **sponsored candidates** (by government, semi-government and public sector undertakings) for this programme. 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 in page no. 22).

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 that of the M Tech programme in Computer Science.

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

GATE Channel of Admission   Same as that of the M Tech programme in Computer Science.

Sponsored candidates   Same as that of the M Tech programme in Computer Science.

Sponsored candidates from the Services of the Government of India   Selection is made through the standard mechanism of the sponsoring organizations, with ISI experts participating at the interview stage.

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   Please refer to the Selection Policy for details of the selection process for all candidates, including sponsored ones. For admission to this programme, valid GATE score is not necessary, and candidates with valid GATE scores also must take the written tests.

Sponsored candidates   Same as that of the M Tech programme in Computer Science.

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.

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   Please refer to the Selection Policy for details of the selection process.

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.

Selection Procedure   Please refer to the Selection Policy for details of the selection process.

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 `https://www.isical.ac.in/~pgdba/` for further details.

6.14   Postgraduate Diploma in Applied Statistics [PGDAS] (provided online through Coursera)

Scope   This online course is meant for individuals who are, or plan to be, involved in the processes of generation, interpretation and management of official data, but are possibly without a formal background in statistics. It aims to impart relevant statistical and computational skills along with basic domain knowledge. The digital mode of the course makes it accessible to working professionals. On successful completion of the course, a student is expected to be better equipped for playing a meaningful role in evidence based policy making and policy research.

This will be a paid course, with provision of tuition waiver. The total duration of this programme is **one year**.

Eligibility   In order to be eligible for this program one must have a graduate degree in any subject and mathematics at the high school (10+2 or equivalent) level.

Selection Procedure   Students of this course will be selected, on the basis of their mathematical skills, through (a) an online test administered through Coursera, or (b) a written test conducted by ISI.

Two batches of students will be selected every year through channel (a), and only one batch through channel (b). Some candidates shortlisted from channel (b) will be offered tuition waiver on the basis of subsequent interview. Please refer to the Selection Policy for details of the selection process of ISI.

6.15   Junior Research Fellowships (JRF)

6.15.1   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), 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 (see Section 7.1, in page no. 36). 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.

Location   The names of the respective centres where research fellowships in a particular subject are being offered this year are given below.

- **Statistics**   Kolkata, Delhi, Bengaluru, Chennai.

- **Mathematics**   Kolkata, Delhi, Bengaluru.

- **Quantitative Economics**　Kolkata, Delhi.

- **Computer Science**　Kolkata, Bengaluru, Chennai. [A JRF assigned to Bengaluru or Chennai Centre may have to go to Kolkata for completing the necessary coursework.]

- **Quality, Reliability & Operations Research (QROR)**　Kolkata, Bengaluru, Delhi, Chennai. [A JRF assigned to Bengaluru, Delhi or Chennai Centre may have to go to Kolkata for completing the necessary coursework.]

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

- 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　Please refer to the Selection Policy for details of the selection process.

PhD at ISI with externally funded Junior Research Fellowships: Candidates who have been awarded a Junior Research Fellowship in the aforementioned research areas by NBHM/ CSIR/ UGC 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. An equivalent admission test for applicants to JRF in Computer Science, who are awardees of CSIR/UGC Junior Research Fellowships, will be held on **June 6, 2022**. Such applicants may refer to the webpage `https://www.isical.ac.in/~admission/Documents/IsiAdmission2022/JRF-CS-Channel2.pdf`.

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, Supply Chain Management, Operations Research, Mathematical Pro-

gramming, Game Theory, Complementarity Theory, Reliability theory, Stochastic Comparison, Entropy, Life testing, Design of Censored Life Test, Reliability Acceptance Sampling, Statistical Quality Control, Statistical Process Control, Control Chart, Process Capability Analysis, Process Optimisation, Multi-response optimization, Quality Engineering.

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, Non-cooperative games, Stochastic Games, Generalized Convexity, Combinatorial Optimization and Matrix Analysis with application in Optimization theory, Design of Experiments, Six Sigma.

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: Quantitative Finance.

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 Quality Control, Statistical Process Control, Control Chart, Process Capability Analysis, Reliability, Six sigma, Lean Six Sigma, Design of Experiments, Taguchi Methods.

CHENNAI

Statistics: Reliability, Survival Analysis.

Mathematics: Mathematical Logic, Game theory.

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

Quality, Reliability & Operations Research (QROR): Operations Research, Semidefinite Linear Complementarity Problems, Stochastic Games, Optimisation, Cooperative games, Reliability, Statistical Quality Control, Statistical Process Control, Process Capability Analysis, Process Optimisation.

6.15.2   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 Section 6.15.1 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/ Mathematics/ Applied mathematics or equivalent
Currently offered in: Kolkata and Bengaluru

(b) Geology

Areas: Palaeontology (invertebrate and vertebrate) and Sedimentology
Eligibility: an M Sc degree in Geology or equivalent with minimum 55% marks
Currently offered in: Kolkata

(c) Biological Science

1. **Areas:** Agricultural and Ecological Research
   Eligibility: M. Sc. in Agricultural Entomology/ Plant Pathology/ Nematology/ Botany/ Zoology/ Microbiology/ Biotechnology
   Currently offered in: Giridih

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

(d) Library and Information Science

Areas: Library and Information Science
Eligibility: MS (LIS) awarded by ISI or Associateship in Documentation and Information Science (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)
Currently offered in: Bengaluru

Selection Procedure   Please refer to the Selection Policy for details of the selection process.

Past academic records may also be taken into consideration[6].

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[6]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 https://www.isical.ac.in/~deanweb/PhDRules_updated.pdf.

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 on-campus degree and diploma 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 `https://www.isical.ac.in/~deanweb/academic.html` 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 degree programmes and the domicile students of the *Postgraduate Diploma in Statistical Methods and Analytics* programme 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. At the end of each semester, prizes are also awarded for outstanding performance in examinations.

Table 6: Stipends, Fellowships and Allowances

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 (CrS)/M Tech (QROR)	12400	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

*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 2022-23 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's degree programmes 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.

9　Application Procedure

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 31, 2022. The institute may decide to relax this date at its discretion. If a student is asked to discontinue from an ISI programme for having failed or on any disciplinary ground, he/she is not eligible for readmission to the same programme.

If a program is offered at multiple locations, the applicant for that programme is asked to choose locations in order of preference. If selected, he/she will be allocated a location according to these preferences depending on availability as per merit list.

Indian nationals residing overseas and foreign nationals, like all other applicants, must take the Admission Test at one of the test cities in India (see Table 8, in page no. 43). Applicants of foreign nationality will be regarded as applicants of the general (unreserved) category.

Applicants seeking admission through the equivalent admission test for JRF in Computer Science to be held on 6 June 2022, who are awardees of CSIR/UGC Junior Research Fellowships, may refer to the webpage https://www.isical.ac.in/~admission/Documents/IsiAdmission2022/ JRF-CS-Channel2.pdf. **All other applications for admission to the programmes being offered by Indian Statistical Institute in the academic year 2022-23 must be done online through the ISI Admission Portal the link to which is available at** https://www.isical.ac.in/~admission.

The applicant must initially register at the ISI Application Portal. 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. After completion of application, the applicant will be able to pay the application fee through the payment gateway. Payment can be made in the online mode (See application portal for details).

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

For Registration on the application portal

- Email ID (The submitted email id will be an unique identifier of your registration. Please use only this email for all future activities in this portal and for all correspondence with ISI.)

For completing the online application

- A mobile number

- A valid Photo ID of the candidate.
  (Permissible Ids are: Voter card/ Aadhaar card/ PAN/ Driving License/ Passport/ Admit card of secondary, higher secondary or equivalent board examination). Only the unique identification number and the type of the Id will be required for the application. You do not have to upload the document.

- Clear digital colour photograph showing your facial features in full frontal view, taken against light background, to be used for verification at the time of examinations.

  - It should be 35 mm in width and 45 mm in height.
  - The permissible file size is 10-300 KB.
  - Only JPG/JPEG/PNG formats are allowed.

- Colour scan of full signature, to be used for verification at the time of examinations.

  - Signature must be on white background with blue ink pen.
  - Signature image must be cropped to a 30 mm × 90 mm box.
  - The permissible file size is 5-100 KB.
  - Only JPG/JPEG/PNG formats are allowed.

- Digital/ scanned copies (only PDF file) of

  - Valid caste (SC/ ST/ OBC-NCL/ EWS) and/or disability certificates if and as applicable,
    Note: OBC-NCL or EWS certificates issued by any competent authority and valid on the date of application will be acceptable. However, at the time of interview, only a certificate issued on or after April 1, 2021 will be considered to be valid.
  - Domicile certificate (for candidates applying for the Postgraduate Diploma in Statistical Methods & Analytics (PGDSMA - Tezpur) at Tezpur, under the category of candidates domiciled in the North-Eastern states of India).
  - Sponsorship letter (for sponsored candidates only) showing the following employment details:
    - name of employer,

- ○ duration of employment,
- ○ designation/ position,
- ○ nature of work/experience including publications (if applicable).
- – If applying for GATE channel seats in **M.Tech. (CS/CrS)**, scanned copy of
  - ○ GATE score card.

Note: For all digital/ scanned documents (excluding photograph and signature), please ensure that the format of the document file is PDF and the file size is less than 2 MB.

For online 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.

Application Fee

Table 7: Application Fee for the year 2022

1	**Rs 1250.00**	for all male applicants in the general category,
2	**Rs 750.00**	for all female candidates in the general category
3	**Rs 625.00**	for applicants belonging to SC/ST/OBC-NCL/EWS/Persons with Disabilities (PwD) categories.

Applicants may have to pay an additional amount towards bank charges.

Mode of payment: See application portal for details.

Submission date: Applications must be submitted by **March 31, 2022**.

Admit Card: All applicants (except those for GATE channel seats) who have paid the application fee successfully will receive a link, through their registered e-mail, for downloading the admit card by **21 April 2022**. After that date, the same can also be downloaded from the Dashboard of their account at the application portal. The admit card will contain the name, photograph, signature and registration number of the candidate, test centre, test code and the date of test. The applicants will be required to carry hard copies of the admit card 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 2022.

Table 8: List of Cities (with Codes) for Admission TEST in 2022

Sl. No.	City	Code	Sl. No.	City	Code
1	Agartala	AT	20	Kharagpur	KH
2	Ahmedabad	AD	21	Kolkata	CC
3	Bengaluru (Bangalore)	BG	22	Lucknow	LN
4	Bhubaneswar	BH	23	Malda	MD
5	Chandigarh	CH	24	Mangaluru	MN
6	Chennai	CN	25	Mumbai	MB
7	Cochin(Kochi)	CO	26	Nagpur	NG
8	Coimbatore	CM	27	Patna	PT
9	Dehradun	DN	28	Pune	PU
10	Delhi	DH	29	Raipur	RP
11	Durgapur	DP	30	Ranchi	RN
12	Guwahati	GH	31	Shillong	SL
13	Hyderabad	HY	32	Silchar	SC
14	Imphal	IM	33	Siliguri	SG
15	Indore	ID	34	Tezpur	TZ
16	Jaipur	JP	35	Thiruvananthapuram	TV
17	Jammu	JA	36	Varanasi	VN
18	Jamshedpur	JS	37	Vijayawada	VJ
19	Kanpur	KN	38	Visakhapatnam	VP

NOTE: Depending on the evolving status of the pandemic, candidates may have to be relocated from one centre to another.

Table 9: Information about Admission Tests for non-JRF Programmes being offered in 2022

Programme	Code (Location)	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	BST	Math	MCQ	UGA	Math	Descriptive	UGB
B Math	BMT	Math	MCQ	UGA	Math	Descriptive	UGB
M Stat	MST	Math, Stat	MCQ	PSA	Math, Stat	Descriptive	PSB
M Math	MMT	Math	MCQ	PMA	Math	Descriptive	PMB
MS (QE)	MQE (Kolkata) / MQE (Delhi)	Math, Eco	MCQ	PEA	Math, Eco	Descriptive	PEB
MS (QMS)	MQM	Math	MCQ	QMA	Math	Descriptive	QMB
MS (LIS)	MLI	Quantitative and Reasoning Ability	MCQ	PLA	Essays and English Comprehension	Descriptive	PLB
M Tech (CS)	MCS	Math	MCQ	MMA	Math/ Comp Sc	Descriptive	PCB
M Tech (CrS)	MCY	Math	MCQ	MMA	Math/ Comp Sc	Descriptive	PCB
M Tech (QROR)	MQR	Math	MCQ	MMA	Stat/Prob/ Math/Engg	Descriptive	PQB
PG Diploma in Statistical Methods & Analytics	DST (Chennai) / DST (Tezpur) / DSD (Tezpur, Domicile)	Math	MCQ	DST	No Test	–	–
PG Diploma in Applied Statistics	DAS	Math	MCQ	DST	No Test	–	–
PG Diploma in Agricultural & Rural Management with Statistical Methods & Analytics	DAR	Math, English Logical Reasoning	MCQ	DRA	No Test	–	–

Note: Abbreviations used in the Test Subject column are explained in the list of abbreviations in page no. 5.

Table 10: Information about Admission Test for Junior Research Fellowships (JRFs) being offered in 2022

Programme	Location	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	JST	Math, Stat	Descriptive	STA	Math, Stat	Descriptive	STB
	Delhi							
	Bengaluru							
	Chennai							
Mathematics	Kolkata	JMT	Math	Descriptive	MTA	Math	Descriptive	MTB
	Delhi							
	Bengaluru							
Quantitative Economics	Kolkata	JQE	Math	Descriptive	QEA	Eco	Descriptive	QEB
	Delhi							
Computer Science	Kolkata	JCS	Elements of Comp Sc, Math	Descriptive	CSA	Comp Sc, Math	Descriptive	CSB
	Bengaluru							
	Chennai							
Quality Reliability & Operations Research	Kolkata	JQR	Math	MCQ	MMA	Math, Stat, OR, SQC, Reliability, Quality Management & Systems	Descriptive	QRB
	Delhi							
	Chennai							
	Bengaluru							
Physics & Applied Mathematics	Kolkata	JPM	Math	MCQ	MMA	Math, Phys	Descriptive	PHB
	Bengaluru							
Biological Science (Agr & Ecol Res)	Kolkata	JAE	Agri Science Basic Stat	MCQ	AEA	Agri Science Basic Stat	Descriptive	AEB
	Giridih							
Biological Science (Human Genetics)	Kolkata	JHG	Biochem, Biotech, Genetics, Mol Bio, Life Sc, Zool	MCQ	HGA	Biochem, Biotech, Genetics, Mol Bio, Life Sc, Zool	Descriptive	HGB
Geology	Kolkata	JGE	Math Geostat	Descriptive	GEA	Geology	Descriptive	GEB
Library & Information Science	Bengaluru	JLI	Lib & Info Sc	MCQ	LIA	Lib & Info Sc	Descriptive	LIB

Note: Abbreviations used in the Test Subject column are explained in the list of abbreviations in page no. 5.

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 in the written 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 for an interview for final selection subject to verification of their eligibility with reference to original documents.

- **Any dispute concerning admissions in 2022-23 shall be settled in Kolkata subject to the jurisdiction of the Kolkata High Court.**

IMPORTANT DATES	
Online Application	Starts: **MARCH 01, 2022**
	Ends: **MARCH 31, 2022**
Issue of Admit Card	Starts: **APRIL 21, 2022**
ISI ADMISSION TEST	**MAY 08, 2022**

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ISI CONVOCATION 2021

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