Scope, Eligibility and Selection Procedure in Admission 2022-2023

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.

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.

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.

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.

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.

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   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.

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.

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. 4).

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.

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.

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.

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.

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.

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.

15 Junior Research Fellowships (JRF)

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. 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 Programming, 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 Eco-

nomics, 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.

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 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[1].

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[1]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.