The Institute offers Teaching Assistantships requiring eight hours of work per week. Students can also be supported by scholarships / fellowships of other organizations such as National Board for Higher Mathematics, Council of Scientific & Industrial Research, University Grants Commission, Department of Science & Technology. For the current round of admissions, RA category seats are not available.

Admissions take place twice a year in June and in December.The candidates should have obtained first class at the Masters degree in Mathematics/Statistics/Computer Science and must have a valid GATE score or an award of NBHM/CSIR/UGC Research Fellowship.

A special welcome to all who wish to pursue a career in Mathematics and Statistics research. The Department of Mathematics, IITB offers Ph.D. program in the areas of Mathematics and Statistics. Admission to the PhD program is based on a written test and interview. There are separate written tests and interviews for students in Mathematics and Statistics. The syllabus is given below. Students are required to choose one option specifying either Mathematics or Statistics.

To know more about the research interests of faculty members, please visit the pagehere. The program leading to the Ph.D. degree involves a course credit requirement, clearing of qualifier examinations and a research project leading to thesis submission. For more details, follow one of the links below

The department conducts a screening test (written exam) for all the shortlisted candidates. The selected candidates will be interviewed and the final selection to the programme is based on the performance in the interview.

Date of the written exam: Monday, December 02, 2024

Reporting time: 8.45 AM

Time: 9:00 AM

Venue: Mathematics Department Office.

Dates of the interviews: Monday, Tuesday and Wednesday (possibly Thursday), December 02, 03 and 04 (possibly 05), 2024

Syllabus for Mathematics Entrance Exam

Syllabus for Statistics Entrance Exam

PhD Admissions

Students in the PhD program have to fulfill the Qualifying Examination requirement within 3 semesters of joining. Please read further for details.

Qualifying Examinations are conducted in the following seven subjects twice every year: (1) Algebra, (2) Analysis, (3) Geometry and Topology, (4) Differential Equations, (5) Probability, (6) Statistics and (7) Combinatorics and Theoretical Computer Science. Typically these exams are conducted during 1-15 July and 15-31 December each year and the results are declared by 21st July and 7th January, respectively. Each exam is out of 100 and the pass mark is 60.

The student may attempt Qualifying Examinations in subjects of his/her choice. In order to fulfill the Qualifying Examination requirement the student has to pass in any two Qualifying Examinations within 3 semesters of joining the PhD program.

In case a student fails to complete the Qualifying Examination requirement at the end of his/her third semester, then he/she has the option of transferring to M.Phil. program, by continuing for about a semester, so as to complete the requirements for an M.Phil.degree.

The student may register with a Ph.D. thesis supervisor after the successful fulfillment of the coursework and Qualifying Examination requirement. Until that time the Faculty Advisor shall be the guide for all official purposes.

Syllabus for qualifying examinations can be foundhere.

All Ph.D students having M.Sc. or equivalent qualification shall acquire a minimum of 34 credits within the first three semesters of joining the Ph.D. program. The students shall also maintain a minimum CPI of 6.0 CPI in each of these semesters. These requirements are to be satisfied subject to the following conditions:(a) Each student must credit at least 3 core Ph.D courses.(b) Credits acquired through Ph.D courses (core/elective) shall be 24 or more.(c) Students may earn upto a maximum of 8 credits through seminar courses (MAS801/MAS802).(d) Students may credit up to two 500-level M.Sc. courses (for example, those that are relevant for the topic of qualifiers) to partially satisfy the credit requirement.

Ph.D. students have to compulsorily take the course MA899 (Communication Skills). Normally they

should pass this course within one year of joining. This course is offered once every year, typically in the Autumn semester and has 0 credits. Students having a qualifying degree from an IIT and who have cleared the ‘Communication Skills’ course during their M.Tech. Program are not required to take the Communication Skills course.
The following core courses are offered in each of the corresponding semesters.

In addition to the above courses, some or all of the following courses may be offered subject to sufficient demand from the students and availability of faculty.
Note:PDF file containing list of all courses can be foundhere.
Note:Each course is of 6 credits with the structure of 3-0-0-6. A prerequisite for an even numbered course is exposure to the preceding odd numbered course, except in the case of MA 824 for which exposure to MA 819 shall be the prerequisite.
A review of field extensions with emphasis on the following topics: Algebraic extensions, algebraic closure, normal extensions, separable extensions, finite fields, inseparable extensions. [DF-13, J1-4, L-V]
Galois theory: Galois extensions, linear independence of characters, norm, trace and discriminants, Hilbert theorem 90, cyclic extensions, solvable and radical extensions, Kummer theory, algebraic independence of homomorphisms, the normal basis theorem, Krull topology, projective limits, profinite groups, fundamental theorem of Galois theory for infinite extensions. [DF-14, J1-4, J2-8, L-VI]
Ring extensions: Integral extensions, integral Galois extensions, prime ideals in integral ring extensions, decomposition and inertia groups, ramification index and residue class degree, Frobenius map, extensions of homomorphisms. [DF-16, J2-7, L-VII]
Transcendental extensions: Transcendental bases, Noether normalization lemma, linearly disjoint extensions, separable and regular extensions, derivations, Hilbert Nullstellensatz. [DF-15, J2-8, L-VIII, L-IX.1]
Dedekind domains: Dedekind domains, unique factorisation of ideals. [DF-16, J2-10, L-VII]
Valuations and completions: Basic definitions, finite dimensional extensions of complete fields, local fields, discrete valuations, Hensel’s lemma, Krasner’s lemma, zeros of polynomials in complete fields. [DF-16, J2-9, L-XII]
[DF] Dummit, Foote: Abstract algebra, second edition, Wiley student editions, 2005.
[J1] Jacobson: Basic algebra, I, Dover publications, 2009.
[J2] Jacobson: Basic algebra, II, Dover publications, 2009.
[L] Lang: Algebra, third edition, Springer-Verlag, GTM 211, 2002
A review of modules over a PID . [DF-12, J1-3, L-III.7]
Noetherian modules and rings: Primary decomposition, Nakayama’s lemma, filtered and graded modules, the Hilbert polynomial, Artinian modules and rings. [DF-15, J2-3, L-X]
Semisimple and simple rings: Semisimple modules, Jacobson density theorem, semisimple and simple rings, Wedderburn-Artin structure theorems, Jacobson radical, the effect of a base change on semisimplicity. [DF-18, J2-3, J2-4, L-XVII]
Representations of finite groups: Basic definitions, characters, class functions, orthogonality relations, induced representations and induced characters, Frobenius reciprocity, decomposition of the regular representation, supersolvable groups, representations of symmetric groups. [DF-18, DF-19, J2-5, L-XVIII]
Categories and functors: Definitions and examples, functors and natural transformations, the equivalence of categories, products and coproducts, the Hom functor, representable functors, universals and adjoints, direct and inverse limits, free objects. [DF-Appendix II, J2-1, L-I.11]
Homological algebra: Additive and abelian categories, complexes and homology, long exact sequences, homotopy, resolutions, derived functors, Ext, Tor, cohomology of groups, extensions of groups. [DF-17, J2-6, L-XX]

[DF] Dummit, Foote: Abstract algebra, second edition, Wiley student editions, 2005.
[J1] Jacobson: Basic algebra, I, Dover publications, 2009.
[J2] Jacobson: Basic algebra, II, Dover publications, 2009.
[L] Lang: Algebra, third edition, Springer-Verlag, GTM 211, 2002
Review of measure theory: monotone convergence theorem, dominated convergence theorem, complete measures. Borel measures: Riesz representation theorem, Lebesgue measure on Rk, Lp spaces
Complex measures: total variation, absolute continuity, Radon-Nikodym theorem, polar and Hahn

decompositions, bounded linear functionals on Lp, generalised Riesz representation theorem.
Differentiation: Maximal function, Lebesgue points, absolute continuity of functions, fundamental theorem of calculus, Jacobian of a differentiable transformation, change of variable formula.
Product measures: Fubini's theorem, completion of product measures, convolutions, Fourier transform, Riemann-Lebesgue lemma, inversion theorem, Plancherel theorem, L1 as a Banach algebra.
Content on a locally compact Hausdorff space, existence and uniqueness of the Haar measure on a locally compact group.
K. Chandrasekharan, A Course on Topological Groups, Hindustan Book Agency, 1996.
L. Nachbin, The Haar Integral, van Nostrand, 1965.
I. K. Rana, An Introduction to Measure and Integration, 2nd Ed., American Mathematical Society, 2002.
H. L. Royden, Real Analysis, 3rd Ed., Prentice Hall of India, 1988.
W. Rudin, Real and Complex Analysis, McGraw-Hill, 1987.
Review of basic complex analysis: Cauchy's theorem, Liouville's theorem, power series representation, open mapping theorem, calculus of residues.
Harmonic functions, Poisson integral, Harnack's theorem, Schwarz reflection principle.
Maximum modulus principle, Schwarz lemma, Phragmen-Lindelof method,.
Runge's theorem, Mittag-Leffler theorem, Weierstrass theorem, conformal equivalence, Riemann mapping theorem, characterisation of simply connected regions, Jensen's formula.
Analytic continuation, monodromy theorem, little Picard theorem.
L. V. Ahlfors, Complex Analysis, McGraw-Hill, 1996.
S. Lang, Complex Analysis, 4th Ed., Springer, 1999.
D. H. Luecking and L. A. Rubel, Complex Analysis: A Functional Analysis Approach, Springer-Verlag, 1984.
R. Narasimhan and Y. Nievergelt, Complex Analysis in One Variable, Birkh user, 2001.
R. Remmert, Theory of Complex Functions, Springer (India), 2005.
W. Rudin, Real and Complex Analysis, McGraw Hill, 1987.
Review of differentiable manifolds, tangent and cotangent bundles, tensors.
DeRham complex, Poincare's Lemma, Mayer-Vietoris sequences, cohomology with compact supports, degree of a map, Poincare duality.
Vector bundles, cohomology with vertical compact supports, Thom isomorphism, twisted DeRham complex, Poincare duality for non-orientable manifolds.
R. Bott and L. W. Tu , Differential Forms in Algebraic Topology, Springer-Verlag, New York, 1982.
L. Conlon, Differentiable manifolds, 2nd Ed., Birkh user, Boston, 2001.
G. E Bredon, Topology and Geometry, Springer-Verlag, New York, 1997.
Paths and homotopy, homotopy equivalence, contractibility, deformation retracts.
Basic constructions: cones, mapping cones, mapping cylinders, suspension.
Cell complexes, subcomplexes, CW pairs.
Fundamental groups. Examples (including the fundamental group of the circle) and applications (including Fundamental Theorem of Algebra, Brouwer Fixed Point Theorem and Borsuk-Ulam Theorem, both in dimension two). Van Kampen's Theorem. Covering spaces, lifting properties, deck transformations, universal coverings.
Simplicial complexes, barycentric subdivision, stars and links, simplicial approximation. Simplicial Homology. Singular Homology. Mayer-Vietoris sequences. Long exact sequence of pairs and triples. Homotopy invariance and excision.
Degree. Cellular Homology.
Applications of homology: Jordan-Brouwer separation theorem, Invariance of dimension, Hopf's Theorem for commutative division algebras with identity, Borsuk-Ulam Theorem, Lefschetz Fixed Point Theorem.
Optional Topics: Outline of the theory of: cohomology groups, cup products, Kunneth formulas, Poincare duality.
M.J. Greenberg and J. R. Harper, Algebraic Topology, Benjamin, 1981.
W. Fulton, Algebraic topology: A First Course, Springer-Verlag, 1995.
A. Hatcher, Algebraic Topology, Cambridge Univ. Press, Cambridge, 2002.
W. Massey, A Basic Course in Algebraic Topology, Springer-Verlag, Berlin, 1991.
J.R. Munkres, Elements of Algebraic Topology, Addison Wesley, 1984.
J.J. Rotman, An Introduction to Algebraic Topology, Springer (India), 2004.

H. Seifert and W. Threlfall, A Textbook of Topology, Academic Press, 1980.
Distribution Theory and Sobolev Spaces:Distributional derivatives, Definitions and elementary properties of Sobolev Spaces, Approximations by smooth functions, Traces, Imbedding Theorems (without proof), Rellich-Kondrachov Compactness Theorem.
Second Order Linear Elliptic Equations:Weak Solutions, Lax-Milgram Theorem, Existence and Regularity Results, Maximum Principles, Eigenvalue Problems.
Second Order Linear Parabolic Equations:Existence of weak solutions and Regularity Results, Maximum Principles.
Second Order Linear Hyperbolic Equations:Existence of weak solutions and Regularity Results, Maximum Principles, Propagation of Disturbance
S. Kesavan, Topics in Functional Analysis and Applications, New Age International Pvt. Ltd., 1989.
L C. Evans, Partial Differential Equation, American Mathematical Society, 1998.
M. Renardy and R. C. Rogers, An Introduction to Partial Differential Equations, Springer-Verlag, 2004.
G. B. Folland, Introduction to Partial Differential Equations, 2nd Ed., Prentice-Hall of India, 1995.
R. C. McOwen, Partial Differential Equations: Methods and Applications, 2nd Ed., Pearson Education, Inc., 2003.
Nonlinear First-Order Scalar Equations:Method of Characteristics, Weak Solutions and Uniqueness for Hamilton-Jacobi Equations, Scalar Conservation Laws: shocks and entropy condition, weak solutions and uniqueness, and long time behavior.
Calculus of Variations:Euler-Lagrange Equation, Second Variations, Existence of Minimizers: Coercivity, Lower-Semicontinuity, Convexity, and Constrained Minimization Problems.
Hamilton-Jacobi Equations:Viscosity Solutions, Uniqueness, Applications to Control Theory and Dynamic Programming.
System of Conservation Laws:Theory of Shock Waves, Traveling Waves, Entropy Criteria, Riemann Problem, Glimm Existence Result for System of Two Conservation Laws.
L C. Evans, Partial Differential Equations, American Mathematical Society, 1998.
M. Renardy and R. C. Rogers, An Introduction to Partial Differential Equations, Springer, 2004.
M. Defermos, Hyperbolic Conservation Laws in Continuum Physics, Springer, 2000.
B. Dacorogna, Direct Methods in Calculus of Variation, Springer 1989.
P. Prasad and R. Ravindran, Partial Differential Equations, Wiley Eastern, 1985.
J. Smoller, Shock Waves and Reaction-Diffusion Equations, Springer, 1993.
Review of conditional expectation : Conditional expectation and conditional probability, regular conditional distributions, disintegration, conditional independence.
Martingales and Stopping times : Stopping times, random time change, martingale property, optional sampling theorem, maximum and upcrossing inequalities, martingale convergence theorem.
Gaussian processes and Brownian motion: Symmetries of Gaussian distribution, existence and path properties of Brownian motion, law of iterated logarithm.
Weak convergence in metric spaces with special reference to C[0, 1], Martingale central limit theorem.
P. Billingsley, Convergence of probability measures, Wiley, 1999.
K. R. Parthasarathy, Probability measures on metric spaces, Academic press, 1967.
V S. Borkar, Probability theory : an advanced course, Springer, NewYork, 1995.
A. W. Van-der-Vaart and J. A. Wellner, Weak convergence and empirical processes: With applications to Statistics, Springer-Verlag, 1996.
D. Williams, Probability with martingales, Cambridge Mathematical textbooks, 1991.
Discrete time Markov chains- definition and examples, stopping times and strong Markov property,Classification of states, Limit theorems. Markov chain mixing- Coupling and total variation distance, Convergence theorem, Mixing time, Mixing and time reversal, Ergodic theorem, upper bound and lower bound on mixing time.
Continuous time Markov chains- definition and examples, embedded Markov chain, Kolmogorov forward and backward equations, classification of states, limit theorems. Random walk – in dimension one, two and three, The Reflection Principle, hitting probabilities of a finite sets, Last visits and Long leads, Maxima and first passages, Duality, position of maxima.
Poisson Process - definition and properties, inter arrival and waiting time distributions, conditional distribution of arrival times.
Hoel, Port and Stone, Introduction to Stochastic Processes.

David A. Levin, Yuval Peres and Elizabeth L. Wilmer, Markov chains and mixing times.
William Feller, An introduction to probability and its applications.
Frank Spitzer, Principles of Random Walk.
Review of probability space. Random variables in R and Rn, distribution of random variables, Expectation of a R-valued random variable, Change of variable formula, Fatou's lemma, monotone convegence theorem, dominated convergence theorem, Jensen's inequality, notion of independence of sigma-fields and random variables, product of distributions, Fubini's theorem.
Convergence almost surely, in probability, in law, convergence in moments, Borel -Cantelli lemma, Uniform integrability of sequence of random variables. Characteristic functions, convolution of distributions, Uniqueness theoerm, Fourier inversion theorem.
Weak law of large numbers, strong law of large numbers, Lindberg-Feller central limit theorem,Law of iterated logarithms.
Radon Nikodym theorem (reading exercise), Condition expectation definition, existence andits properties, regular conditional law.
KL Chung, A course in probability theory.
P. Billingsley, Probability and measure.
Robert B. Ash, Probability and measure theory.
Review of normed linear spaces, Hahn-Banach theorems, uniform boundedness principle, open mapping theorem, closed graph theorem, Riesz representation theorem on Hilbert spaces.
Weak and weak* convergence, reflexivity in the setting of normed linear spaces.
Compact operators, Sturm-Liouville problems.
Spectral projections, spectral decomposition theorem, spectral theorem for a bounded normal operator, unbounded operators, spectral theorem for an unbounded normal operator.
M. Ahues, A. Largillier and B. V. Limaye, Spectral Computations for Bounded Operators, Chapman & Hall/CRC, 2001.
J. B. Conway, Functional Analysis, 2nd Ed., Springer-Verlag, 1990.
S. Lang, Complex Analysis, 4th Ed., Springer, 1999.
B. V. Limaye, Functional Analysis, 2nd Ed., New Age International Publishers, 1996.
F. Riesz and B. SzNagy, Functional Analysis, Dover Publications, 1990.
W. Rudin, Functional Analysis, Tata McGraw Hill, 1974.
K. Yosida, Functional Analysis, 5th Ed., Narosa, 1979.
Face rings of simplical complexes, rings of invariants of finite groups, local cohomology of modules and its applications to Cohen-Macaulay Gorenstein rings and face rings of simplicial complexes
W.Bruns and J. Herzog, Cohen-Macaulay rings, Cambridge University Press, 1992. J. Herzog and T. Hibi, Monomial Ideals, Springer 2011.
A selection of topics from the following:
Regular sequences, grade and depth. Projective dimension, Auslander-Buchsbaum formula. Koszul complex. Rank of modules. Buchsbaum-Eisenbud acyclicity criterion. Graded rings and modules. Basic properties of graded modules: associated primes, dimension etc.
Hensel's Lemma, Newton' Theorem and Weierstrass Preparation Theorem.
Chevalley's Theorem on invariants of a finite pseudo-reflection group acting on the polynomial ring.
The Jacobian criterion for regularity. Divisor class group of a noetherian normal domain and its properties under ring extensions etc. Applications to unique factorization.
Cohen-Macaulay rings. Homological characterization of regular local rings.
Injective hulls, Matlis Duality. Local cohomology. Basic properties. Invariance under flat and finite base changes. Canonical module: Existence and basic properties. Local duality and applications. Canonical module of graded rings.
S. S. Abhyankar, Lectures on Algebra, Vol. I, World Scientific, Hackensack, NJ, 2006.
W. Bruns and J. Herzog, Cohen-Macaulay Rings, Revised second edition, Cambridge University Press, 1998
H. Matsumura, Commutative Ring Theory, Cambridge University Press, 1989.
A selection of topics from the following:
Cohen-Macaulay rings and modules, Canonical Module, Gorenstein rings.
Hilbert functions and multiplicities, Macaulay's Theorem
Stanley-Reisner rings, shellability.

Semigroup rings and rings of invariants
Determinantal rings, Straightening law.
Big Cohen-Macaulay modules, Hochster's finiteness theorem.
S. S. Abhyankar, Lectures on Algebra, Vol. I, World Scientific, Hackensack, NJ, 2006.
W. Bruns and J. Herzog, Cohen-Macaulay Rings, Revised second edition, Cambridge University Press, 1998
H. Matsumura, Commutative Ring Theory, Cambridge University Press, 1989.
A selection of topics from the following:
Singular Integrals (Calderon-Zygmund theory), the Kakeya problem, the Uncertainty Principle, the almost everywhere convergence of Fourier series, multilinear operators between Lp spaces.
Pseudodifferential operators, Index theorems.
Advanced complex analysis in one variable: Nevanlina theory, the existence of quasi-conformal maps, iterated polynomial maps, complex dynamics, compact Riemann surfaces, the Corona theorem.
Holomorphic functions in several complex variables: elementary properties of functions of several complex variables, analytic continuation, subharmonic functions, Hartog's theorem, automorphisms of bounded domains.
R.C. Gunning, Introduction to holomorphic functions of several variables. Vol. I. Function theory, Wadsworth & Brooks/Cole, 1990.
A.W. Knapp, Advanced real analysis, Birkhauser, 2005.
S. Lang and W. Cherry, Topics in Nevanlinna theory, Springer-Verlag, 1990.
R. Narasimhan, Several complex variables, University of Chicago Press, 1995.
E.M. Stein, Harmonic Analysis: Real Variable Methods,Orthogonality, and Oscillatory Integrals, Princeton University Press, 1993.
S. Thangavelu, An Introduction to the Uncertainty Principle: Hardy's Theorem on Lie Groups, Birkhauser, 2004.
A selection of topics from the following:
Fourier Series and Fourier Transforms:Orthonormal Sequences in Inner Product Spaces, Fourier Series, Riemann-Lebesgue Lemma, Convergence/Divergence of Fourier Series, Fejer Theory, Fourier Transform, Inversion Theorem, Approximate Identities, Plancherel Theorem
Hp spaces:Harmonic and Subharmonic Functions, Hp spaces, Nevanlinna Class of Functions, Boundary Values, Non-tangential Limits, F. and M. Riesz Theorem, Inner Functions, Outer Functions, Factorization Theorems, Beurling's Theorem
Banach Algebras:Examples of Banach Algebras, Spectrum, Gelfand Representation, C*-Algebras, Positive Linear Functionals, Gelfand-Naimark Representation
Elements of Operator Theory:Hilbert Space Operators, Parts of Spectrum, Orthogonal Projections, Invariant Subspaces, Reducing Subspaces, Shifts, Decompositions of Operators
Perturbation Theory for Linear Operators:Analyticity of the resolvent operator, spectral projection and the weighted mean of the eigenvalues, The method of majorizing series, Spectral Decomposition Theorem.
Spectral Approximation:Norm and nu- convergence, Iterative refinement methods such as the Rayleigh-Schrodinger series and methods based on the fixed point techniques, error estimates.
Approximate solutions of Operator Equations:Galerkin, Iterated Galerkin and Nystrom methods, Condition Numbers, Two Grid Methods.
M. Ahues, A. Largillier, B.V. Limaye, Spectral Computation for bounded operators, Chapman & Hall/CRC, 2001.
K.E. Atkinson, The Numerical Solution of Integral Equations of the Second Kind, Cambridge University Press, 1997.
G. Bachman, L. Narici and E. Beckenstein, Fourier and Wavelet Analysis, Springer-Verlag, 2000.
S. K. Berberian, Lectures in Functional Analysis and Operator Theory, Narosa Publishing House, 1979.
F. Chatelin, Spectral Approximation of Linear Operators, Academic Press, 1983.
J.B. Conway, A Course in Functional Analysis, Springer-Verlag, 1985.
P.L. Duren, Theory of Hp spaces, Dover Publications, 2000.
W. Hackbusch, Integral Equations: Theory and Numerical Treatment, Birkhauser, 1995.
T. Kato, Perturbation Theory for Linear Operators, Springer-Verlag, 1995.
R. Kress, Linear Integral Equations, Second Edition, Springer-Verlag, 1999.
P. Koosis, Introduction to Hp spaces, 2nd Edition, Cambridge University Press, 1999.

C.S. Kubrusly, An Introduction to Models and Decompositions in Operator Theory, Birkhauser, 1997.
G.J. Murphy, C*-Algebras and Operator Theory, Academic Press Inc., 1990.
W. Rudin, Real and Complex Analysis, McGraw-Hill, 1987.
W. Rudin, Functional Analysis, McGraw Hill, 1991.
A. Vretblad, Fourier Analysis and its Applications, Springer-Verlag, 2005.
A selection of topics from the following:
Basic Combinatorial Objects : Sets, multisets, partitions of sets, partitions of numbers, finite vector spaces, permutations, graphs etc.
Basic Counting Coefficients: The twelve fold way, binomial, q-binomial and the Stirling coefficients, permutation statistics, etc.
Sieve Methods : Principle of inclusion-exclusion, permutations with restricted positions, Sign-reversing involutions, determinants etc.
Combinatorial reciprocity.
Theory of Symmetric functions.
C. Berge, Principles of Combinatorics, Academic Press, 1972.
I.G. Macdonald, Symmetric functions and Hall polynomials. Second edition, Oxford University Press, 1995.
R.P. Stanley, Enumerative Combinatorics, Vol. I, Wadsworth and Brooks/Cole, 1986.
A selection of topics from the following:
Partially ordered sets, Mobius inversion.
Rational generating functions: P-partitions and linear Diophantine equations.
Polya theory and representation theory of the symmetric group.
Combinatorial algorithms, and symmetric functions.
Generating functions: Single and multivariable Lagrange inversion.
Young tableaux and plane partitions
M. Aigner, Combinatorial Theory, Springer-Verlag, New York, 1979.
I. G. Macdonald, Symmetric functions and Hall polynomials. Second edition, Oxford University Press, New York, 1995.
B.E. Sagan, The Symmetric Group: Representations, Combinatorial Algorithms and Symmetric Functions, Wadsworth & Brooks/Cole, 1991.
R. P. Stanley, Enumerative Combinatorics, Vol. I, Wadsworth and Brooks/Cole, Monterey, CA, 1986.
R. P. Stanley, Enumerative Combinatorics, Vol. II, Cambridge University Press, Cambridge, 1999.
A selection of topics from the following:
Review of the theory of curves and surfaces in the Euclidean 3-space.
Differentiable manifolds, and Riemannian structures. Connections, and curvature tensor.
The theorems of Bonnet-Meyers and Hadamard. Manifolds of constant curvature.
J. M. Lee, Riemannian Manifolds: An Introduction to Curvature, Springer-Verlag, New York, 1997.
W. M. Boothby, An Introduction to Differentiable Manifolds and Riemannian Geometry, 2nd edition, Academic Press, 2002.
M. Do Carmo, Differential Geometry of Curves and Surfaces, Prentice Hall, 1976.
S. Kumaresan, A Course in Differential Geometry and Lie Groups, Hindustan Book Agency, 2002.
J. Milnor, Morse Theory, Princeton University Press, 1963.
A selection of topics from the following:
Affine and projective varieties, rational maps, nonsingularity.
Algebraic Curves, Riemann Roch Theorem.
Sheaves and Schemes. Basic properties. Divisors and Differentials.
Cohomology of sheaves, Serre Duality Theorem.
S. S. Abhyankar, Algebraic Geometry for Scientists and Engineers, American Mathematical Society, Providence, RI, 1990.
D. Eisenbud and J. Harris, The Geometry of Schemes, Springer-Verlag, 2000.
R. Hartshorne, Algebraic Geometry, Springer-Verlag, 1977.
I. R. Shafarevich, Basic Algebraic Geometry, Vol. 1 and 2, Second edition, Springer-Verlag, 1994.
A selection of topics from the following:
CW complexes, Homotopy groups, Cellular Approximation.
Whitehead’s theorem, Hurewicz theorem.

Excision, Fibre bundles, Long exact sequences.
Postnikov Towers, Obstruction Theory.
Stable homotopy groups. Spectral Sequences, Serre Class of abelian groups.
B. Gray, Homotopy Theory, Academic Press, 1975.
A. Hatcher, Algebraic Topology, Cambridge University Press 2002.
G. W. Whitehead, Elements of Homotopy Theory, Springer Verlag, 1978.
P. Hilton, Homotopy Theory and Duality, Gordon and Beach Sc. Publishers, 1965.
N. Steenrod, The Topology of Fibre Bundles, 7th reprint, Princeton University Press, 1999.
R. M. Switzer, Algebraic topology: Homotopy and Homology, Springer Verlag, 2002.
A selection of topics from the following:
Basics of Topological groups, Lie group.
Group actions, homogeneous spaces examples.
G-spaces, existence of slice and tubes
Covering homotopy theorem, Classification of G-Spaces.
Finite group actions, homology spheres
G-coverings, Cech theory
Locally smooth actions, orbit types, principal orbits
Actions of tori.
Cohomology structure of fixed point sets, Z_p-actions projective spaces and product of spheres.
G. E. Bredon, Introduction to Compact Transformation Groups, Academic Press 1972.
T. Br cker and T. tom Dieck, Representations of Compact Lie Groups, Springer-Verlag, New York, 1985.
W. Y. Hsiang, Cohomology Theory of Topological Transformation Groups, Springer-Verlag, 1975.
A selection of topics from the following:
Algebraic number theory, abelian and non-abelian reciprocity laws, the Langlands programme, automorphic forms and representations.
The arithmetic of algebraic groups.
Arithmetic algebraic geometry: counting rational points of varieties over finite fields
Galois representations and galois cohomology.
Additive number theory: partitions, compositions, Goldbach problem.
S. Lang, Algebraic number theory., Second edition, Springer-Verlag, New York, 1994.
D. Bump, Automorphic forms and representations, Cambridge University Press, Cambridge, 1997.
H. Iwaniec and E. Kowalski, Analytic number theory, American Mathematical Society, Providence, RI, 2004.
H. Hida, Modular forms and Galois cohomology, Cambridge University Press, Cambridge, 2000.
A selection of topics from the following:
Harmonic analysis on Lie groups, L-functions, l-adic representations and motives.
Diophantine equations and the applications of K-theory to number theory.
Analytic number theory and transcendental methods.
Applications of ergodic theory to number theory.
S. Lang, Algebraic number theory., Second edition, Springer-Verlag, New York, 1994.
D. Bump, Automorphic forms and representations, Cambridge University Press, Cambridge, 1997.
H. Iwaniec and E. Kowalski, Analytic number theory, American Mathematical Society, Providence, RI, 2004.
H. Hida, Modular forms and Galois cohomology, Cambridge University Press, Cambridge, 2000.
A selection of topics from the following:
Schauder theory, regularity for second order elliptic equations. Nonlinear analysis and its applications to nonlinear PDEs: Fixed point methods, variational methods, monotone iteration, degree theory.
Evolution equations: Existence via semigroup theory
Nonlinear Hyperbolic systems: Theory of well posedness, compensated compactness,
Young measures; propagation of oscillations, weakly nonlinear geometric optics.
D. Gilbarg and N.S. Trudinger, Elliptic Partial Differential Equations of Second Order, Springer-Verlag, 1983.
P. Grisvard, Elliptic Problems in Nonsmooth Domains, Pitman, 1984.
D. Serre, Systems of Conservation Laws, Vols. 1, 2, Cambridge University Press, 2000.
L. Evans, Weak Convergence Methods for Nonlinear PDEs, CBMS Regional Conference series in Math.,

American Mathematical Society, Providence RI, 1990
A. Bensoussan, J.L. Lions and G. Papanicolaou, Asymptotic Analysis for Periodic Structures, North Holland, 1978.
M. Struwe, Variational Methods: Applications to nonlinear PDEs and Hamiltonian systems, Springer-Verlag, 1990.
A selection of topics from the following:
Diffeomorphisms and flows: Elementary dynamics of diffeomorphisms, flows and differential equations, conjugacy, equivalence of flows, Sternberg's theorem on smooth conjugacy (statement only), Hamiltonian flows and Poincare maps.
Local properties of flows and diffeomorphisms: Hyperbolic fixed points, Hartman-Grobman theorems for maps and flows, Normal forms for vector fields, Centre manifolds.
Structural stability and hyperbolicity: Structural stability for linear systems, Flows on 2-dimensional manifolds, Peixoto's characterisation of structural stability on unit disc, Anosov and Horseshoe diffeomorphisms, Homoclinic points, Melnikov function.
Bifurcations and Perturbations: Saddle-node and Hopf bifurcations, Andronov-Hopf bifurcation, The logistic map, Arnold's circle map; Perturbation theory: Melnikov's method for the study of perturbation of completely integrable systems.
Floquet theory and Hill's equation and some of its applications.
Two dimensional systems: Poincare-Bendixon theorem, Index of planar vector fields and the Poincare Hopf index theorem for two dimensional manifolds.
Van der Pol's equation, Duffing's equation, Lorenz's equation.
First integrals and functional independence of first integrals, notion of complete integrability, Jacobi multipliers, Liouville's theorem on preservation of phase volume, Jacobi's last multiplier theorem and its applications.
D. K. Arrowsmith, C. M. Place: An Introduction to Dynamical Systems, Cambridge University Press, 1990.
C. Chicone, Ordinary Differential Equations. Springer-Verlag, 1999.
J. Guckenheimer and P. Holmes, Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Vector Fields. Springer-Verlag, 2002.
P.Glendinning, Stability, instability and chaos: An Introduction to the Theory of Nonlinear Differential Equations, Cambridge University Press, 1994.
J. Palis and W. C. de Melo, Geometric Theory of Dynamical Systems, Springer-Verlag, 1982.
R. Grimshaw, Nonlinear Ordinary Differential Equations. CRC press, 1991.
N.A. Magnitskii and S.V. Sidorov, New Methods for Chaotic Dynamics, World Scientific, 2006.
L. Perko, Differential Equations and Dynamical Systems, Springer-Verlag, 2001.
A selection of topics from the following:
Review of finite difference methods for elliptic, parabolic and hyperbolic problems. Stability, consistency and convergence theory.
Finite difference schemes for scalar conservation laws (Lax-Friedrichs, Upwind, Lax-Wendroff, etc.), Conservative schemes and their numerical flux functions, Consistency, Lax-Wendroff Theorem, CFL Condition, Nonlinear Stability and TVD property, Monotone Difference schemes, Numerical entropy condition, Convergence result.
Finite difference Schemes for one-dimensional system of conservation laws, approximate Riemann solvers, Godunov's method, High resolution methods, Multidimensional approaches.
Large Scale Scientific Computing: Classical Iterative Methods for solving Linear systems, Large Sparse Linear Systems, Storage Schemes, GMRES algorithm, Preconditioned Conjugate Gradient method and Multi-grid method, Newton's Method and some of its variations for solving nonlinear systems.
Axelsson, O. Iterative Solution Methods, Cambridge University Press, 1994.
Briggs, W. L., Henson, V. E. and McCormick, S. F. A Multigrid tutorial, SIAM, 2000.
Godlewski, E. and Raviart, P. –A. Numerical Approximation of Hyperbolic Systems of Conservation Laws, Springer, 1995.
Kroner, D. Numerical Schemes for Conservation Laws. John Wiley, 1997.
LeVeque, R. J. Finite Volume Methods for Hyperbolic Problems, Cambridge University Press, 2002.
LeVeque, R. J. Numerical Methods for Conservation Laws. Birkhauser, 1992.
Quarteroni, A. and Valli, A. Numerical Approximation of Partial Differential Equations, Springer, 1997.

Ueberrhuber, C. W. Numerical Computation: Methods, Software and Analysis, Springer-Verlag, 1997.
A selection of topics from the following:
Mixed Finite Element Methods:Examples of mixed variational formulations- primal, dual formulations; abstract mixed formulations, discrete mixed formulations, existence-uniqueness of solutions, convergence analysis, implementation procedures.
Adaptive FEM:A study of -Explicit A posteriori error estimators, Implicit A posteriori estimators, Recovery based error estimators, Goal Oriented adaptive mesh refinement for second order elliptic boundary value problems.
Discontinuous Galerkin Methods for second order elliptic boundary value problems:Global element methods, Symmetric Interior Penalty Method, Discontinuous hp- Galerkin Method, Non-symmetric interior penalty method: Consistency, approximation properties, existence and uniqueness of solutions, error estimates, implementation procedures.
FEM for parabolic problems:The standard Galerkin method, semi-discretization in space. discretization in space and time, the discontinuous Galerkin Method, a mixed method, implementation procedures.
Elements of Multigrid Methods:Multigrid Components - Interpolation, restriction Coarse-grid correction, V, W, and FMG cycles, Implementation, Convergence analysis, Performance diagnostics.
Z. Chen, Finite Element Methods And Their Applications, Springer-Verlag, New York, 2005.
S. C. Brenner and R. L. Scott, The Mathematical Theory of Finite Element Methods, 2nd Edition, Springer-Verlag, New York, 2002.
M. Ainsworth and J. T. Oden, A Posteriori Error Estimation in Finite Element Analysis, John Wiley and Sons, 2000.
V. Thomee, Galerkin Finite Element Methods for Parabolic Problems, 2nd Edition, Springer-Verlag, Berlin, 2006.
A selection of topics from the following:
Stochastic optimal control: compactness of laws, dynamic programming principle.
Malliavin calculus and applications to finance: Wiener-Ito chaos expansion, Shorohod integral, Integration by parts formula, Clark- Ocone formula and application to finance.
V.S. Borkar, Optimal control of diffusion processes, Longman Scientific and Technical, Harlow (copublished by John Wiley), 1989.
D. Nualart, The Malliavin calculus and related topics, Springer-Verlag, 1995.
A selection of topics from the following:
Univariate Stochastic Orders-hazard rate order, likelihood ratio order, mean residual rate order. Univariate variability orders- convex order, dispersive order, peakedness order. Univariate monotone convex and related orders. Multivariate stochastic orders. Multivariate variability and related orders. Statistical Inference for stochastic ordering. Applications in reliability theory, biology, economics and scheduling.
J. George Shanthikumar and Moshe Shaked (1994) Stochastic Orders and their Applications, Academic press.
C.D. Lai and M. Xie (2006) Stochastic Ageing and Dependence for Reliability, Springer Verlag.
A selection of topics from the following:
Inference in Semi-parametric models: Models with infinite imensional parameters, Efficient estimation and the delta method, Score and information operators, Estimating equations, Maximum Likelihood estimation, Testing.
Generalized linear models: Components of a GLM, estimation techniques, diagnostics, continuous response models, Binomial response models, Poisson response models, overdispersion, multivariate GLMs, quasi likelihoods, generalized estimating equations, generalized linear mixed models, programming in R and SAS.
A. W. Van der Vaart, Asymptotic Statistics, Cambridge University Press, 2000.
U. Grenander, Abstract Inference, John Wiley, 1981.
P. McCullagh and J. A. Nelder, Generalized Linear Models, 2nd Edition, Chapman and Hall/CRC, 1994.
L. Fahrmeir and G. Tutz, Multivariate Statistical Modeling based on Generalized Linear Models, 2nd Edition, Springer-Verlag, 1994.
R. H. Myers, D. C. Montgomery and G. Geoffrey Vining, Generalized Linear Models with applications in Engineering and Sciences, Wiley-Interscience, 2001.
Basic Extremal Combintorics: Chains and antichains, Sunflower Lemmas , Intersecting Families , Density theorems

Basic Enumerative Combinatorics : Ordinary Generating functions , Exponential Generating Functions , Quasi-polynomials and applications to Ehrhart theory, Transfer Matrix Method, Stanley's Reciprocity Theorem, Exponential Structures, Trees , Lagrange inversion Theorem, Composition of generating functions and Exponential Formula
Extremal Set Theory : Sperner's Theorem, Theorems of Erdos-Ko-Rado, KruskalKatona, Dilworth's theorem, Kleitman's lemma for ideals and correlation inequalities.
Graph theory : Matching theory, Hamiltonicity, Extremal graph theory, Graph colorings, Ramsey theory
Enumerative Combinatorics - Stanley, Vol.1 (2nd Edition) and 2, Cambridge University Press.
Extremal Combinatorics With Applications in Computer Science - Stasys Jukna, Springer, 2nd Edition.
Computing the Continuous Discretely : Integer-point Enumeration in Polyhedra - Beck and Robbins, Springer, 2nd edition.
Combinatorics of Finite Sets - Anderson, Dover Books on Mathematics.
Modern Graph theory - Ballobas, Graduate Texts in Mathematics, Springer.
Matchings and SDRs , Linear Algebra method , Polynomial method , combinatorial Nullstellensatz and applications.
Mobius Inversion on Posets
Advanced Enumeration : Permutation Statistics and generalizations to Coxeter groups, Enumeration with Symmetric Functions, RSK Algorithm, Frobenius characteristic, The Jacobi-Trudi identity, Murnaghan-Nakayama Lemma, LittlewoodRichardson rule.
Enumerative Combinatorics - Stanley, Vol.1 (2nd Edition) and 2, Cambridge University Press.
Extremal Combinatorics With Applications in Computer Science - Stasys Jukna, Springer, 2nd Edition
The Symmetric Group : Representations, Combinatorial Algorithms, and symmetric functions - Bruce Sagan, Graduate texts in Mathematics, Springer, 2nd ed.
Representation Theory : A combinatorial Viewpoint - A. Prasad, Cambridge University Press
Combinatorics of Coxeter Groups : Bjorner and Brenti, Graduate Texts in Mathematics, Springer.
Symmetric Functions and Hall Polynomials - Macdonald, Oxford Mathematical monographs.
Linear Algebra methods in Coombinatorics - Babai/Frankl, lecture notes.
The Polynomial method in Combinatorics - survey paper by T. Tao
Incidence Theorems and Their Applications - Z. Dvir, Foundations and Trends in Theoretical Computer Science, Now Publishers Inc.
1) Parametric models, exponential and location-scale family, Sufficiency, MinimalSufficiency, Complete Statistic, Decision Rule, Loss Function and Risk, Pointestimators, consistency, asymptotic bias, variance and MSE, asymptoticinference.[Chapter 2]
2) UMVUE, U-statistics, Asymptotic Unbiased estimator, V-statistics [Chapter 3]
3) Bayes Decision and Bayes estimators, Invariance, Minimaxity and admissibility,MLE and efficient estimation method. [Chapter 4]
4) The NP Lemma, monotone likelihood ratio, UMP test for one sided and two sidedhypothesis, UMP Unbiased test, UMP invariant test, likelihood ratio test, chi-squaredtest, Sign, permutation and rank test, Kolmogorov- Smirnov and Cramer-von Misestest and asymptotic test [Chapter 6.]
Main text: Jun Shao, Mathematical Statistics, 2nd Ed., Springer, 2003.Additional Texts: Theoretical Statistics D.R. Cox, D.V. Hinkley CRC PressE. L. Lehmann, Theory of Statistical Inference, Wiley, 1983.E. L. Lehmann, Testing Statistical Hypotheses, Wiley, 1986.
Categories, functors, natural transformations.
Limits, colimits, complete and cocomplete categories.
Adjoint functors, universal constructions, free and cofree objects.
Functor categories, comma categories, quotient categories, derived categories.
Representable functors, Yoneda lemma.
Cauchy completeness, Karoubi envelopes.
Cartesian categories, group objects. The above concepts can be motivated and discussed by connecting them to other areas of mathematics depending on the interests of the instructor and students.
Aguiar and Mahajan, Monoidal functors, species and Hopf algebras, American Mathematical Society, 2010.
Awodey, Category theory, Oxford University Press, 2010.
Borceau, Handbook of categorical algebra, Volumes 1, 2 and 3, Cambridge University Press, 1994.
Goerss and Jardine, Simplicial homotopy theory, Birkhauser, 1997.

Hirschhorn, Model categories and their localizations, American Mathematical Society, 2003.
Leinster, Higher categories, Higher operads, Cambridge University Press, 2004.
Leinster, Basic category theory, Cambridge University Press, 2014.
Mac Lane, Categories for the working mathematician, Springer, 1998
Monoidal categories, monoids, comonoids.
Symmetric monoidal categories, braidings, Hopf monoids.
Higher monoidal categories.
Enriched categories, 2-categories, bicategories, higher categories.
Monads, distributive laws, higher monads. The above concepts can be motivated and discussed by connecting them to other areas of mathematics depending on the interests of the instructor and students.
Aguiar and Mahajan, Monoidal functors, species and Hopf algebras, American Mathematical Society, 2010.
Awodey, Category theory, Oxford University Press, 2010.
Borceau, Handbook of categorical algebra, Volumes 1, 2 and 3, Cambridge University Press, 1994.
Goerss and Jardine, Simplicial homotopy theory, Birkhauser, 1997.
Hirschhorn, Model categories and their localizations, American Mathematical Society, 2003.
Leinster, Higher categories, Higher operads, Cambridge University Press, 2004.
Leinster, Basic category theory, Cambridge University Press, 2014.
Mac Lane, Categories for the working mathematician, Springer, 1998
Full rank model (Chapters 3 and 4)Models with rank deficiency (Chapter 5: Sections 5.1,5.2,5.3,5.4,5.5)One-way classification model (Chapter 6: Sections 6.1,6.2,6.3,6.4)Two-way Crossed Classification model (Chapter 7: Sections 7.1,7.2)Fixed, Random and Mixed models for Balanced Data (Chapter 9.1-9.5, 9.8, 9.9)
Main Text: Linear Models by S.R. Searle (1971) Wiley & SonsOther References: Linear Model Methodology by A. I. Khuri (2009) CRC Press
Ph.D. handbook can be foundhere.
Several useful forms can be foundhere.
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Table:

Course Code	Name of the Course	L	T	P	C
MA 811	Algebra I	3	0	0	6
MA 813	Measure Theory	3	0	0	6
MA 815	Differential Topology	3	0	0	6
MA 817	Partial Differential Equations I	3	0	0	6
MA 833	Weak Convergence and Martingale Theory	3	0	0	6
MA 861	Combinatorics-I	3	0	0	6
MA 863	Theoretical Statistics I	3	0	0	6

Table:

Course Code Name of the Course L T P C
MA 812 Algebra II 3 0 0 6
MA 814 Complex Analysis 3 0 0 6
MA 816 Algebraic Topology 3 0 0 6
MA 818 Partial Differential Equations II 3 0 0 6
MA 820 Stochastic Processes 3 0 0 6
MA 823 Probability I 3 0 0 6
MA 824 Functional Analysis 3 0 0 6
MA 862 Combinatorics-II 3 0 0 6
MA 867 Statistical Modelling- I 3 0 0 6

Table:

Course Code Name of the Course L T P C
MA 839 Advanced Commutative Algebra 3 0 0 6
MA 841 Topics in Algebra I 3 0 0 6
MA 843 Topics in Analysis I 3 0 0 6
MA 845 Topics in Combinatorics I 3 0 0 6
MA 847 Topics in Geometry I 3 0 0 6
MA 849 Topics in Topology I 3 0 0 6
MA 851 Topics in Number Theory I 3 0 0 6
MA 853 Topics in Differential Equations I 3 0 0 6
MA 855 Topics in Numerical Analysis I 3 0 0 6
MA 857 Topics in Probability I 3 0 0 6
MA 859 Topics in Statistics I 3 0 0 6
MA 864 Topics in Category Theory I 3 0 0 6
MAS 801 Seminar 0 0 0 4

Table:

Course Code Name of the Course L T P C
MA 842 Topics in Algebra II 3 0 0 6
MA 844 Topics in Analysis II 3 0 0 6
MA 846 Topics in Combinatorics II 3 0 0 6
MA 848 Topics in Geometry II 3 0 0 6
MA 850 Topics in Topology II 3 0 0 6
MA 852 Topics in Number Theory II 3 0 0 6
MA 854 Topics in Differential Equations II 3 0 0 6
MA 856 Topics in Numerical Analysis II 3 0 0 6
MA 858 Topics in Probability II 3 0 0 6
MA 860 Topics in Statistics II 3 0 0 6
MA 865 Topics in Category Theory II 3 0 0 6
MAS 802 Seminar 0 0 0 4

Ordered List:

Ordered List:

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Ordered List:

Ordered List:

Ordered List:

The department offers a two-year M.Sc. Mathematics programme. The program allows you to choose from a variety of elective courses together with the compulsory ones. Performance of students each semester is continuously assessed through regular quizzes, class tests, and mid- and end-semester examinations. In addition to the usual course work also involves pursuing an optional one-year research project during the second year. Depending on the area of mathematics that interests you most, you can choose your supervisor for your optional research project.

The curriculum can be foundhere.
Through JAM 2024
JAM is only desirable, not mandatory.
Foreign nationals (that is, those who are not Indian nationals) may seek admission to the MSc (Mathematics/Statistics) program by submitting an application to the link given below.https://portal.iitb.ac.in/intadm/loginEligibility criteria:(1) Candidate must be a foreign national (that is, Passport holder of a foreign country/OCI/PIO card holder).(2) The last qualifying degree must be from a foreign university/Institute.(3) Medium of instruction in the last qualifying degree should be English.Admission procedure:
Applications satisfying the above three criteria will be scrutinized by the Department of Mathematics (courses undertaken in the last qualifying degree, grades). This will be followed by a written exam and/or Interview.
Students in the M.Sc. programmes (Mathematics and ASI) in the IIT Bombay Mathematics department will be allowed entry into the PhD programme if they meet the following requirements.
(i) The student must have a CPI of 7.5 at the end of third semester.
(ii) The student must have no course backlogs.
(iii) The student must pass the Ph.D. entrance examination and interview conducted in December.
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Table:

Name Year Supervisor Thesis Title
342 Kiran kumar A S 2024 Prof. Koushik Saha On eigenvalues of Linial-Meshulam complex and Generalized patterned random matrices
341 Brahadeesh Sankarnarayanan 2024 Prof. Niranjan Balachandran Some problems in combinatorics: Excursions in graph colorings and extremal set theory
340 Rahul Kumar 2024 Prof. Prachi Mahajan THE BERGMAN-FRIDMAN INVARIANT ON SOME CLASSES OF PSEUDOCONVEX DOMAINS
339 Sahasrabudhe Ojas Ravikant 2024 Prof. Sudhir Ghorpade CONTINUED FRACTIONS AND DIOPHANTINE APPROXIMATIONS
338 Savita Pareek 2023 Prof. Siuli Mukhopadhyay On Some Problems in Mixed Effect Models
337 Vijay Kumar 2023 Prof. P. Vellaisamy Adomian Polynomials and some Fractional Stochastic Processes
336 Archita Mondal 2023 Prof. Preeti Raman Adjoint groups of type Dn over fields of vcd < or = 2
335 Reshmi M.N. 2023 Prof. Santanu Dey Multi-Analytic Operators, Colligations and Functional Models
334 Poonam Pokale 2023 Prof. Sudarshan R. Gurjar & Prof. Rekha Santhanam TOPOLOGY OF SURFACES AND CLASSIFICATION OF AFFINE CURVES
333 Samir Panja 2023 Prof. Bata Krishna Das Dilations of Operator Tuples and Factorization of Toeplitz Operators
12345678910111213141516171819202122232425262728293031323334 35NextLast

The 5 year integrated M.Sc. programme in Mathematics is available to students at IIT Bombay who have completed at least one year of their undergraduate studies. Students can request for a change to this programme to the Department of Mathematics at the end of their first year, after securing permission from their parent department. Students wishing to switch branches after the second year must have done sufficiently many mathematics courses during their second year. The applications for those wishing to enter this programme are reviewed on a case-by-case basis by the Department of Mathematics and forwarded with a suitable recommendation to the Dean of Academic Programmes.
The programme offers rigorous coursework ensuring a strong foundational base. In addition to a number of "core" basic courses, students are required to complete at least nine elective courses and are encouraged to take at least a few advanced courses at the Ph.D. level. Students must also register for a fifth year project which allow them to explore an individual area of their choice in greater depth.
Though the numbers enrolling in this programme have been small, the students are highly motivated and have been very successful. All the students who have graduated have gone on to pursue doctorates in mathematics at some of the most prestigious universities in the world.

While the students so far have largely been academically inclined, the coursework potentially equips them with a wide range of skills suitable for employment outside of academia as well.
The curriculum can be foundhere.
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3	Hrishika Agrawal	24B3303
4	Mihir Girish Kamath	24B3304
5	Arnav Mandar Vedanti	24B3305
6	Kishan D	24B3306
7	Dheeraj Yadav	24B3307
8	Vipin Gour	24B3308
9	Bharat Gautam	24B3309
10	Abhishek Kumar	24B3310
11	Shivam Singh	24B3311
12	Zen Nitishkumar Yeslawath	24B3312
13	Nandani Sharma	24B3313
14	Madhav Varshney	24B3314
15	Anagh Paresh Dhake	24B3315
16	Vuggi Sneha	24B3316
17	Aarush Bhatt	24B3317
18	Aritra Das	24B3318
19	Yash Vardhan	24B3319
20	Arjun Gupta	24B3320

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3	Anuj Anil Jha	23B3303
4	Harsh Agrawal	23B3304
5	Kokare Swapnil Fulchand	23B3305
6	Arrol Sebastian Noronha	23B3306
7	Nirav Rajendra Bhattad	23B3307
8	Mantavya Maan	23B3308
9	Divye Goyal	23B3309
10	Madhav	23B3310
11	Sahana Jahagirdar	23B3311
12	Rakshit Rane	23B3312
13	Sumit	23B3313
14	Shikhar Gupta	23B3314
15	Aditya Khambete	23B3315
16	Aniruddh Kumar Sharma	23B3317
17	Shreeya Choudhary	23B3318
18	Ayush Ramesh Pawar	23B3319
19	Dhairya Kantawala	23B3321
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21	Panav Harnish Shah	23B3323

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8	Kashish Talwar	22B3308@iitb.ac.in
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12	Manav Sanjay Jain	22B3312@iitb.ac.in
13	Ashwin S	22B3313@iitb.ac.in
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19	Ankan Kumar Mete	22B3319@iitb.ac.in
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27 Prabhat Harish Dubey 22B0009@iitb.ac.in
28 Sumeet Santosh Samant 22B2711@iitb.ac.in

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2 Anish Amol Kulkarni 21B090002
3 Anish Yogesh Kulkarni 21B090003
4 Aparna Agrawal 21B090004
5 Aryaman Sharma 21B090005
6 Ayan Mallick 21B090006
7 Harsh Agarwal 21B090007
8 Harsh Chauhan 21B090008
9 Himanth P 21B090009
10 Khaparde Aryan Shrikant 21B090010
11 Khushi Wadhwa 21B090011
12 Lakshana S 21B090012
13 Madhav Gupta 21B090013
14 Manav Kumawat 21B090014
15 Mukul Rai 21B090015
16 Raunak Kumar 21B090016
17 Shumail Malik 21B090017
18 Siddharth Bhagat 21B090018
19 Srishti Gautam 21B090019
20 Vibhu Verma 21B090020
21 Vippala Sasank Reddy 21B090021
22 Om Swostik Mishra 21B090022
23 Sanat Arora Kuruganti 21B091001
24 Sooraj A P 210110104

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Table:

S. No. Visitor with affiliation Host Faculty Duration of Visit
1 Kapil Paranjape Prof. Sudarshan Gurjar 07/01/2020 - 12/05/2020
2 Mythily Ramaswamy, Chennai Mathematical Institute Prof. Debanjana Mitra 06/01/2020 - 06/03/2020
3 Andreas Rosenschon Prof. S. R. Ghorpade 17/02/2020 - 15/03/2020
4 Amit Tripathi, IIT Hyderabad Prof. Ronnie Sebastian 27/02/2020 - 01/03/2020
5 Nilanjan Chatterjee, Johns Hopkins University Prof. S V Sabnis 26-02-2020
6 Martina Hofmanova, Bielefeld University via video conference 25-02-2020
7 Nitin Nitsure, TIFR, Mumbai Prof. Sudarshan Gurjar 24-02-2020
8 Stefan Schwede, University of Bonn Prof. Rekha Santhnam 20-02-2020
9 Kartick Adhikari, I.I.T Technion, Israel. Prof. Kaushik Saha 13-02-2020
10 Marie-Francoise Roy, University of Rennes. Prof. Neela Nataraj 10-02-2020
11 Mrinmoy Datta, Arctic University of Norway, Tromso. Prof. Sudhir Ghorpade 06-02-2020
12 Anand Sawant, School of Mathematics, TIFR Prof. Dipendra Prasad 06-02-2020
13 Siva Athreya, Indian Statistical Institute, Bangalore. Prof. Suresh Kumar 05-02-2020
14 Anand Sawant, School of Mathematics, TIFR Prof. Dipendra Prasad 29.01.2020
15 Marius Tucsnak, Universite de Bordeaux Prof. Debanjana Mitra 27.01.2020
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The minor programme in Mathematics is designed to allow engineering and science students to pursue a more rigourous education in mathematics. The minor courses have been selected to represent the different basic areas of mathematics. A student completing these courses will achieve a better understanding of the mathematical techniques used in the sciences and engineering disciplines and will also be well equipped for further advanced mathematical education. Twenty (20) students will be admitted in the courses offered under this programme.
Note that the institute mandates that at least 30 credits need to be earned in order to obtain a minor in a given discipline.
Courses offered under the minor programme in Mathematics:
Statistical analysis, modeling and inference are required in almost all areas of the natural and

social sciences, technology and industrial research and development. There has always been a

demand for trained graduates and specialists in different branches of Statistics.
The M.Sc. (Applied Statistics and Informatics) offered by the Mathematics department caters to

this need. For the benefit of B. Tech. students interested in applying statistics in their discipline

of graduation or for those aspiring for jobs that require statistical analytics and decision making,

the Department also offers a minor programme comprising of the following important

foundational courses to a limited number (maximum 20) of selected students of B. Tech. at IIT

Bombay.
Note that the institute mandates that at least 30 credits need to be earned in order to obtain a

minor in a given discipline.
Courses offered under the minor programme in Statistics:
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Table:

Course Code	Title	L	T	P	C	Semester of Offerings	Pre-requisites
MA 403	Real Analysis	3	1	0	8	Autumn	None
MA 419	Basic Algebra	3	1	0	8	Autumn	None
MA 406	General Topology	3	1	0	8	Spring (Odd years)	MA 403
MA 412	Complex Analysis	3	1	0	8	Spring (Even years)	None
MA 522	Fourier Analysis and Applications	3	1	0	8	Spring	MA 403

Table:

Course Code	Title	L	T	P	C	Semester of Offerings	Pre-requisites
SI 427	Probability I	3	1	0	8	Autumn	None
SI 424	Statistical Inference I	3	1	0	8	Autumn	SI 427
SI 422	Regression Analysis	3	1	0	8	Spring (Even years)	SI 424
SI 404	Applied Stochastic Processes	3	1	0	8	Spring (Odd years)	SI 427
SI 527	Introduction to Derivative Pricing	2	1	0	6	Spring	SI 427

The student/the University needs to forward the following documents to IITB:

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Table:

Name Affiliation Period of Stay Designation
Prof. Krishna B. Athreya Iowa State University 01.07.2016 - 29.06.2018 Distinguished Visiting Professor
Prof. R. Balasubramanian IIT Bombay 01.08.2017 - 31.07.2020 Distinguished Guest Professor and Head, National Centre for Mathematics
Prof. Markus Brodmann Institut für Mathematik, Universität Zürich 05.07.2016 - 04.07.2018 Visiting Professor
Prof. Mahir Bilen Can Tulane University 02.01.2023 - 01.01.2025 Visiting Professor
Prof. Carsten Carstensen Humboldt-Universitüt zu Berlin, Germany 05.9.2022 - 04.09.2024 Distinguished Visiting Professor
Prof. Kalyan Das IIT Bombay 21.12.2017 - 20.12.2019 Visiting Professor (Contract)
Prof. Sujit K. Ghosh North Carolina State University 25.01.2023 - 24.01.2025 Honorary Visiting Professor
Prof. R.V. Gurjar IIT Bombay 18.09.2023 - 17.09.2025 Distinguished Visiting Professor
Prof. Trygve Johnsen UiT The Arctic University of Norway 18.08.2023 - 17.12.2023 Honorary Visiting Professor
Prof. Hira Lal Koul Michigan State University 10.01.2023 - 09.01.2025 Distinguished Visiting Professor
Prof. Bishnu P. Lamichhane University of Newcastle 17.01.2023 - 16.01.2025 Honorary Visiting Professor
Prof. D.V. Pai IIT Bombay 03-07-2007 Professor Emeritus
Prof. Kapil Hari Paranjape IISER Mohali 07.01.2020 - 12.05.2020 Visiting Professor
Prof. Kartik Prasanna University of Michigan 06.06.2023 - 05.06.2025 Visiting Professor
Prof. Mythily Ramaswamy Chennai Mathematical Institute, India 06.01.2020 - 05.01.2021 Visiting Professor
Prof. Inder K. Rana IIT Bombay 01.07.2015 - 30.06.2020 Emeritus Fellow
Prof. Jean-Pierre Raymond University Paul Sabatier 24.01.2023 - 23.01.2025 Visiting Professor
Prof. V.D. Sharma IIT Bombay 01.11.2017 - 18.10.2019 Emeritus Fellow
Prof. Ngo Viet Trung Vietnam Academy of Science and Technology 28.11.2023 - Distinguished Visiting Professor
Prof. Muthusamy Vanninathan IIT Bombay 02.11.2016 - 01.11.2019 Visiting Professor (Contract)

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Sanjay Sarmalkar Sr. Administrative Superintendent (P) sanjaycs 7451
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Ashutosh R. Mulik Jr. Administrative Assistant ashu 7451
Meet Pendor Jr. Administrative Assistant meet 7451
N.B.Ranade Sr. Multi-skilled Assistant ranade 7452
H. B. Mali Sr. Multi-skilled Assistant mali 7452
Anil D. Bagul System Administrator abagul 4455
Aarti D. Lokhande Skilled Casual Staff 7451
Mangesh Gaikar Un-skilled Casual Staff 7451
Shanu Konkal Un-skilled Casual Staff 7451

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5	PALLAVI SUTHAR	24N0235
6	SIMRAN DASHLANIYA	24N0236
7	MARTAND PURI	24N0237
8	RAJVEER SINGH	24N0238
9	SATVIK SHARMA	24N0239
10	UJJWAL KUMAR MISHRA	24N0240
11	RICK GEORGE FERNANDES	24N0241
12	HEMANT KUMAR	24N0242
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14	HRIDYANAND KUMAR	24N0244
15	KOUSHIK CHAKRABORTY	24N0245
16	ANUBRATA GHOSH	24N0246
17	AKASH ALOM	24N0247
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6 AMIT SANDESH PATANGE 24N0046
7 SARTHAK BALASAHEB GAME 24N0047
8 PREKSHA AGARWAL 24N0048
9 LEKHRAJ MEENA 24N0049
10 KUNAL PRAJAPAT 24N0050
11 PRAVEEN KUMAR MEENA 24N0051
12 JENITHRIKA S 24N0052
13 NAVEEN KUMAR 24N0053
14 VAMSHI NAYAK BANOTHU 24N0054
15 RAGHAV AGRAWAL 24N0055
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22 SAHIL SINGH 24N0062
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26 JITESH YADAV 24N0066
27 ROHAN KARMAKAR 24N0067
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29 ATREYEE ROY 24N0069
30 TATHAGAT PANDEY 24N0070
31 PRITAM NASKAR 24N0071
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35 ANIRUDDHA MUKHERJEE 24N0075
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38 SIBOHAM PATTANAYAK 24N0078
39 PRIOM PAL 24N0079
40 SOURAV MAHARA 24N0080
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44 ANAMIKA BASU THAKUR 24N0084

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28 RAJ SHARMA 23N0068
29 ANKIT MAURYA 23N0069
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31 SAGAR KUMAR 23N0071
32 ROHIT JANA 23N0072
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38 ARIJIT RAY 23N0078
39 SWASTIK BHOWMICK 23N0079
40 RUPANJAN MUKHERJEE 23N0080
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44 KAUSTAV PAUL 23N0084
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48 SHARIF KAMBOJ 23N0088

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2 170050008 Sawant Sohan Madhukar sohans
3 170070006 manav Sanjay Batavia manav
4 170100013 Vora Kirtan kirtan
5 170100101 Poduri Pradyumna Datta ppdatta
6 170110004 Atharva Dinesh Pangarkar
7 18B030023 Sanjyot Vinyak Shenoy
8 18D180029 Vastal Srivastava

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Name Email (@math.iitb.ac.in) Roll(@iitb.ac.in) Office Date of Joining Category Supervisor Area
1 Satya Sai Aditya Duggaraju 24D0781 26-Jul-24
2 Pooja Lamba 24D0782 26-Jul-24
3 Sherin Abraham 24D0783 26-Jul-24
4 Harshita Agarwal 24D0784 26-Jul-24
5 Soumyajit Acharyya 24D0785 26-Jul-24
6 Lavanya V 24D0786 26-Jul-24
7 Subhajit Mukherjee 24D0787 26-Jul-24
8 Animesh Sinha 24D0788 26-Jul-24
9 Indrashis Gain 24D0789 26-Jul-24
10 Imran Hussain (M.Sc. & Ph.D. Dual Degree) 22N0245 26-Jul-24
11 Ramdas Omkar Prasad 23D0787 03-Jan-24 TA
12 Kaushik Khamari 23D0788 03-Jan-24 TA
13 Swapnamoy Sikder 23D0789 03-Jan-24 TA
14 Niladri Sekhar Patra 23D0790 03-Jan-24 TA
15 Poduri Pradyumna Datta 23D0791 03-Jan-24 FA
16 Pradip Kumar Maity 23D0792 03-Jan-24 FA
17 Satyabrata Paul 23D0793 03-Jan-24 FA
18 Vinay Kumar Sharma 23D0794 03-Jan-24 FA
19 Bhawani Singh 23D0795 03-Jan-24 FA
20 Prerna Gupta 23D0796 03-Jan-24 FA
21 Pradip Roy 23D0797 03-Jan-24 FA
22 Siyad Rahman M 23D2054 03-Jan-24 Sponsored
23 Kshitij Sinha 23D0781 28-Jul-23 TA
24 Sai Sriharsha Indukuri 23D0784 28-Jul-23 CSIR
25 Dibendu Pal 23D0785 28-Jul-23 CSIR

26 Surajit Pal 23D0786 28-Jul-23 UGC
27 Lal Bahadur Sahu(M.Sc.-Ph.D. Dual Degree) 215090034 28-Jul-23
28 Lekha Das 22D0790 23-Dec-22 TA
29 Shivani 22D0791 23-Dec-22 FA
30 Bittu Singh 22D0781 25-Jul-22 TA Rekha Santhanam
31 Janhvi Patel 22D0783 25-Jul-22 TA
32 Amal Das 22D0784 25-Jul-22 TA
33 Hamidul Ahmed 22D0785 25-Jul-22 TA Bata K. Das
34 Sayed Sadiqul Islam 22D0786 25-Jul-22 TA
35 Amanpreet Singh 22D0787 25-Jul-22 TA
36 Debapriya Ojha 22D0788 25-Jul-22 FA
37 Adarsh Gupta 22D0789 25-Jul-22 Foreign national (Schol)
38 Unnati Nigam 22D2014 25-Jul-22 SW (Monash)
39 Aratrika Pandey 214090004 31-Dec-21 TA Ravi Raghunathan
40 Mayank Shankar Dayal Rai 214090005 31-Dec-21 TA
41 Swapan Jana 214090006 31-Dec-21 PMRF Sourav Pal Multivariable operator theory
42 Aroda Priyanka Darshanlal 214093002 31-Dec-21 NBHM
43 Sahin Mandal 214093003 31-Dec-21 NBHM
44 Soumyadeb Samanta 214093005 31-Dec-21 NBHM Bata Krishna Das, Mayukh Mukherjee
45 Rishi Das 214094001 31-Dec-21 Monash (SW) Harsha Hutridurga Ramaiah
46 Aamir Yousuf 214104007 31-Dec-21 Monash (SW) Nataraj Neela, Amit Singh
47 Mayukh Choudhury 214090002 23-Jul-21 TA Debraj Das Bootstrap & Asymptotic Theory of Statistics
48 Pallab Kumar Sinha 214090003 23-Jul-21 TA Siuli Mukhopadhyay
49 Suraj Panigrahy 214099001 23-Jul-21 RA Mallesham Kummari
50 Ankita Dargad (M.Sc.-Ph.D. Dual Degree) 195280006 23-Jul-21 TA
51 Shiv Kumar Yadav 204090008 05-Jan-21 TA Monika Bhattacharjee
52 Samarendra Sahoo 204093008 05-Jan-21 UGC Tony J. Puthenpurakal Topics in Commutative and Homological Algebra
53 Saikat Maji 204093009 05-Jan-21 CSIR Mayukh Mukherjee
54 Hari Prasadh P 204093010 05-Jan-21 CSIR
55 Shuvayan Banerjee 204094001 05-Jan-21 Monash (SW) Radhendushka Srivastava, Ajit V. Rajwade
56 Raunak Shirish Shevade 204090004 05-Jan-21 TA Monika Bhattacharjee
57 Umesh Shankar 204093001 05-Jan-21 NBHM Prof. Krishnan Sivasubramanian
58 Parvez Rasul 204090001 10-Aug-20 PMRF Ronnie Sebastian
59 Niphadkar Shubham Sanjay 204090007 10-Aug-20 TA Siuli Mukhopadhyay
60 Sakshi 204093005 10-Aug-20 CSIR Sudhir R. Ghorpade
61 Sai Krishna P M S 204099001 10-Aug-20 PMRF Manoj K Keshari
62 Javadekar Omkar Deepak (M.Sc.-Ph.D. Dual Degree) 185090007 10-Aug-20 TA Ananthnarayan Hariharan
63 Mohammed Saad Munaf Qadri(M.Sc.-Ph.D. Dual Degree) 185090012 10-Aug-20 TA U.K. Anandavardhanan
64 Makadiya Deepkumar Hasamukhbhai deepkumar 194090008 09-Jan-20 TA Shripad M. Garge
65 Nitin Tomar 194093004 09-Jan-20 PMRF Sourav Pal Operator theory
66 Rati Ludhani lrati 194090001 24-Jul-19 PMRF Sudhir R. Ghorpade Coding Theory
67 Akash Yadav akashy 194090003 24-Jul-19 TA Ravi Raghunathan Algebraic Number Theory
68 Chayan Karmakar chayan 194093001 24-Jul-19 NBHM Dipendra Prasad, Ravi Raghunathan
69 Saumyajit Das saumyajit 194099001 24-Jul-19 NBHM Harsha Hutridurga Ramaiah
70 Rahul Singh Karki rahulsk 184090004 02-Jan-19 TA Madhusudan Manjunath Combinatorial Commutative Algebra
71 Dibyendu Biswas dibu 184099001 02-Jan-19 RA Dipendra Prasad, Shripad M Garge Algebra and Number theory
72 Magar Priyanka Tanaji priyanka 184093003 13-Jul-18 CSIR Sudarshan Gurjar Differential topology
73 Vikrant Desai vikrant 174093013 201 02-Jan-18 UGC K. Suresh Kumar Stochastic Dynamical Systems
74 Krishan Kumar krishankumar 174093011 208 14-Jul-17 UGC Harsha Hutridurga, Amiya K. Pani Partial

Differential Equations
75 Lalit Kumar lalitkumar 164093011 201 28-Dec-16 External Sivaji Ganesh sista Nonlocal Partial Integro Differential Equations
76 Utkarsh Tripathi utkarsh 164093007 201 14-Jul-16 NBHM Srikanth Srinivasan Combinatorics and Theoretical Computer Science

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Aditiben Savalia aditis Number Theory Ravi Raghunathan 01-Feb-24
Anubhav Sharma anubhav Analytic Number Theory Kummari Mallesham 01-Sep-23
Aparajita Karmakar aparajita Topology Rekha Santhanam 01-Jan-24
Arusha C arusha Algebraic Geometry Sudarshan R. Gurjar 01-Aug-23
Kalyan Barman barmankalyan Applied Probability Ayan Bhattacharya 03-Jul-23
Brahadeesh Sankarnarayanan bs Extremal combinatorics and graph theory Niranjan Balachandran 05-Aug-24
Chaman Kumar Sahu chamanks Operator Theory Bata Krishna Das 18-Dec-23
Divya Kappara divyak Spatio-temporal Modelling Siuli Mukhopadhyay 14-Oct-24
Subrata Golui golui Risk-sensitive control theory, Stochastic control K. Suresh Kumar 05-Jul-23
Himadri Halder himadri Operator Theory Sourav Pal 22-Feb-23
Iswar Mahato iswar Spectral Graph Theory Krishnan Sivasubramanian 01-Sept-23
Om Prakash om.prakash Combinatorial Commutative Algebra Madhusudan Manjunath 06-Sep-23
Pankaj Dey pankaj Operator Algebra, Operator Theory Santanu Dey 03-Oct-23
Priyanka Sen priyankasen Probability Theory Monika Bhattacharjee 25-Sep-23
Puspendu Pradhan puspendu Finite Geometry, Algebraic Coding Theory Sudhir R. Ghorpade 04-Nov-24
Repana Devendra r.deva Operator Algebra, Quantum Information Theory Santanu Dey 01-Apr-24
Raman Kumar raman Partial Differential Equations and Numerical Analysis Neela Nataraj 22-Nov-23
Ramesh Mete rameshm Differential Geometry and Geometric Analysis Saikat Mazumdar 04-Nov-24
Ramesh Chandra Sau rcsau Finite Element Methods for PDEs Neela Nataraj 25-Jan-24
Renu Joshi renujoshi Group Theory and Representation Theory Shripad M. Garge 13-Nov-24
Rakesh Jana rjana Spectral Graph Theory Krishnan Sivasubramanian 30-Mar-22
Samiran Ghosh samiran Mathematical Epidemiology Siuli Mukhopadhyay 11-Jun-24
Shubham Rastogi shubhamr Operator Theory Bata Krishna Das 01-Feb-24
Somnath Gandal somnath Partial Differential Equations Saikat Mazumdar 11-Jun-24
Souptik Chakraborty soupchak Geometric analysis and Partial Differential Equation Mayukh Mukherjee 30-Mar-22
Sumanta Das sumanta Low-dimensional topology Rekha Santhanam 28-Oct-24
Utsab Sarkar utsab Partial Differential Equations Mayukh Mukherjee 09-Jan-24

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This academic programme also has a Home Paper Project component in the second year under which the students may opt for industry oriented or applied/basic research oriented project as per their inclination, background, and potential.
The curriculum can be foundhere.
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Students in the M.Sc. programmes (Mathematics and Statistics) in the IIT Bombay Mathematics department will be allowed entry into the PhD programme if they meet the following requirements.
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(ii) The student must have no course backlogs.
(iii) The student must pass the Ph.D. entrance examination and interview conducted in December.

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We offer a variety of postgraduate programmes, as well as a doctoral research programme for highly motivated students looking to pursue an academic or industrial career in Mathematics or Statistics. Apart from the PhD programme, the department has (1) a four year BS programme in Mathematics, (2) a five year BS+MSc in Mathematics, (3) a five year BS in Mathematics with an MSc in Statistics, (4) a two year MSc in Mathematics, and (5) a two year MSc in Statistics, all these for new entrants. Other than these programmes, we offer (1) a five year Integrated MSc in Mathematics, (2) an Inter Disciplinary Dual Degree Program (IDDDP) in Mathematics, and (3) an IDDDP in Statistics for students already enrolled in IIT Bombay. For more details see ourCourse Curriculum Booklet.
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Mathematics is one of the oldest fields of human inquiry and integral to our culture and heritage. Its grand questions have been motivated as much by our fascination with its inherent beauty and complexity as by the practical considerations of architecture, science, and technology. In the modern world, mathematics thrives in its central role as the language of traditional science, while reaching further into the realms of engineering, finance, and social sciences.

The B.S. in Mathematics at IIT Bombay is designed to build a strong foundation in the initial semesters, while encouraging students to pursue more targeted interests in the second half of the programme through advanced elective courses within the Department of Mathematics. The curriculum also includes basic science courses and incorporates elective courses from the science, engineering, and humanities disciplines, allowing for considerable flexibility and academic freedom. The entrance to this programme is through JEE (Advanced).

Students are required to complete basic courses in algebra, combinatorics, calculus and analysis, differential equations, and probability. More advanced courses in these subjects, as well as in geometry, topology, number theory, numerical analysis, statistics, and theoretical computer science will be on offer. Motivated students will benefit from the presence of active research groups in all of these areas. The Honours programme promotes deeper scholarship within mathematics while the Minor programme enables the pursuit of interests in other departments.

The curriculum can be foundhere

The B.S. in Mathematics is designed to equip its graduates with a wide range of mathematical skills and knowledge and provide exposure to science, engineering and other subjects. They will be well-placed to make significant contributions to academia, industry and other important institutions in our society.

Entry to BS programme is through any one of the following two modes:

(1) JEE (Advanced) as per institute norms.

(2) Students who have appeared for their Class 12 board examinations or any equivalent qualifying examinations in 2024 and have been on the INMO Qualified List for Junior or Senior Batch in 2024 or any previous year are eligible to apply. Up to 6 (six) such eligible students will be admitted to the B.S. Mathematics programme based on their performance in an entrance examination which will be conducted by the Department of Mathematics, IIT Bombay.

Those satisfying the eligibility criteria should apply to take the entrance exam by sending an email tobsinmo@math.iitb.ac.inwith a copy marked tooffice.math@iitb.ac.inwith the subject "Application for the B.S. Mathematics Entrance Examination via INMO". A scanned copy of the INMO Award certificate and/or letter of invitation for the IMO training camp should be attached with the email. The last date to receive applications isMay 14, 2024. Eligible candidates will be informed about the details of the entrance testby email and the list of eligible candidates will be posted on this website on May 15, 2024.If you have any queries please write tobsinmo@math.iitb.ac.inwith a copy tooffice.math@iitb.ac.in

The exam and/or interview will be held in person on June 03, 2024 in the Department of Mathematics, IIT Bombay, Powai, Mumbai, 400076.

Candidates must make arrangements to be present in person on June 03 in the Department of Mathematics, IIT Bombay. They are required to present the original INMO Award certificate and/or letter of invitation for the IMO training camp.

Accommodation for candidates can be arranged at the IIT Bombay campus (on a payment basis) if candidates include such a request in their email application to take the entrance exam.

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