- ✓ The short-listing criteria for written screening test are attached below.

- ✓ Shortlisted applicants (regular and part time) will be intimated online and they have to appear in a Written Screening Test to be held on Wednesday, 18-05-2016, from 9:00-10:00 am.

- ✓ The written screening test will comprise of 15 multiple choice questions.

- ✓ The syllabus of the written test is posted below.

- ✓ The eligible applicants are requested to report for the written screening test on 18-05-2016 by 8:30 am.

- ✓ The venue of the exam will be announced on Department web page.

- ✓ The top 25% in each category (GEN, OBC, SC, ST, PH) will then be shortlisted for interview.

- ✓ Ph.D. interview for I Semester 2016–2017 will be held on 18, 19 & 20 of May 2016.

- ✓ Final selection to the PhD admission will be based only on the performance of the candidate in the interview.

- ✓ Any applicant who fulfils the short listing criteria and do not get a letter for the written screening test, may seek clarification by sending an e-mail to   hkumar@maths.iitd.ac.in

Ph.D. Written Screening Test Syllabus

Vector Spaces over fields of rational, real and complex numbers, subspaces, linear independence, linear span of a set of vectors, basis and dimension of a vector space, sum and direct sum, system of linear (homogeneous and non-homogeneous) equations, matrices and Gauss elimination, elementary row operations, row space, column space, null space and rank of a matrix.

Linear transformation, rank-nullity theorem and its applications, matrix representation of a linear transformation, changes of basis and similarity, eigenvalues and eigenvectors, characteristic and minimal polynomials, Cayley Hamilton theorem and applications, diagonalization.

Inner product spaces over fields of real and complex numbers, Gram-Schmidt orthogonalization process, orthogonal projection.

Elementary set theory, countable and uncountable sets, definition of a real number, Archimedean property, sequences of real numbers, limit superior and limit inferior, Cauchy sequence, convergence, Bolzano-Weierstrass theorem, series of real numbers, convergence.

Functions of one and several variables, limits, continuity and differentiability, Taylor's theorem, Taylors series, inverse function theorem, implicit Function theorem, open sets, closed sets in reals, compactness, connectedness in reals, uniform continuity and the mean value theorems for real valued functions, maxima and minima, Riemann integral, fundamental theorem, improper integrals.

Short-listing Criteria for Regular Applicants:

Category	Undergraduate Degree	Postgraduate Degree	Scholarship
General	BA/ BSc with 60% or above	MA/MSc with 60% or above	JRF: CSIR / UGC/ NBHM /DST
	BA/ BSc with 60% or above	MA/ MSc with 60% or above	GATE score 400 or above
	BA/BSc with 60% or above	MA/ MSc with 60% or above	A student having MTech with 60% or above or CGPA 6.75 or above out of 10, is exempted from GATE/JRF.
	60% or above or CGPA 6.75 or above out of 10 for 5 year Integrated MSc	---	JRF: CSIR/UGC/NBHM/DST or GATE score 400 or above. A student having MTech with 60% or above or CGPA 6.75 or above out of 10, is exempted from GATE/JRF.
	60% or above or CGPA 6.75 or above out of 10 for 5 year Integrated/dual degree MTech	---	Exempted
	BA/BSc with 60% or above	MA/MSc with CGPA 8.0 or above from IITs	Exempted
	BTech with 70% or above or CGPA 7.5 or above out of 10	---	JRF: CSIR/UGC/NBHM/DST or GATE score 400 or above. A student having MTech with 60% or above or 6.75 or above out of 10 is exempted from GATE/JRF.
	BS with 70% or above or CGPA 7.5 or above out of 10	---	JRF: CSIR/UGC/NBHM/DST or GATE score 400 or above. A student having MTech with 60% or above or 6.75 or above out of 10 is exempted from GATE/JRF.
	BTech from IITs with CGPA 8.0 or above out of 10	---	Exempted
	BTech from CFI with CPI/CGPA 7.0 or above out of 10 at the end of 3rd year	---	Exempted
OBC	BA/ BSc with 60% or above	MA/MSc with 60% or above	JRF: CSIR / UGC/ NBHM /DST
	BA/ BSc with 60 % or above	MA/ MSc with 60% or above	GATE score 360 or above
	BA/BSc with 60% or above	MA/ MSc with 60% or above	A student having MTech with 60% or above or CGPA 6.75 or above out of 10, is exempted from GATE/JRF.
	60% or above or CGPA 6.75 or above out of 10 for 5 year Integrated MSc	----	JRF: CSIR/UGC/NBHM/DST or GATE score 360 or above. A student having MTech with 60% or above or CGPA 6.75 or above out of 10, is exempted from GATE/JRF.
	60% or above or CGPA 6.75 or above out of 10 for 5 year Integrated/dual degree MTech	---	Exempted
	BA/BSc with 60% or above	MA/MSc with CGPA 8.0 or above from IITs	Exempted
	BTech with 70% or above or CGPA 7.5 or above out of 10	---	JRF: CSIR/UGC/NBHM/DST or GATE score 360 or above.

			A student having MTech with 60% or above or 6.75 or above out of 10 is exempted from GATE/JRF.
	BS with 70% or above or CGPA 7.5 or above out of 10	---	JRF: CSIR/UGC/NBHM/DST or GATE score 360 or above. A student having MTech with 60% or above or 6.75 or above out of 10 is exempted from GATE/JRF.
	BTech from IITs with CGPA 8.0 or above out of 10	---	Exempted
	BTech from CFI with CPI/CGPA 7.0 or above out of 10 at the end of 3rd year	---	Exempted
SC/ST/PH	BA/ BSc with 55% or above	MA/MSc with 55% or above	JRF: CSIR / UGC/ NBHM /DST
	BA/ BSc with 55% or above	MA/ MSc with 55% or above	GATE score 200 or above
	BA/BSc with 55% or above	MA/ MSc with 55% or above	A student having MTech with 55% or above or CGPA 6.25 or above out of 10, is exempted from GATE/JRF.
	55% or above or CGPA 6.25 or above out of 10 for 5 year Integrated MSc	----	JRF: CSIR/UGC/NBHM/DST or GATE score 200 or above. A student having MTech with 55% or above or CGPA 6.25 or above out of 10, is exempted from GATE/JRF.
	55% or above or CGPA 6.25 or above out of 10 for 5 year Integrated/dual degree MTech	---	Exempted
	BA/BSc with 60% or above	MA/MSc with CGPA 8.0 or above from IITs	Exempted
	BTech with 65% or above or CGPA 7.0 or above out of 10	---	JRF: CSIR/UGC/NBHM/DST or GATE score 200 or above. A student having MTech with 55% or above or CGPA 6.25 or above out of 10, is exempted from GATE/JRF.
	BS with 65% or above or CGPA 7.0 or above out of 10	---	JRF: CSIR/UGC/NBHM/DST or GATE score 360 or above. A student having MTech with 60% or above or 6.75 or above out of 10 is exempted from GATE/JRF.
	BTech from IITs with CGPA 8.0 or above out of 10	---	Exempted
	BTech from CFI with CPI/CGPA 7.0 or above out of 10 at the end of 3rd year	---	Exempted

- In case CGPA is not on a 10 point scale then an equivalent scaled criterion will be considered.

- B.Tech. and M.Tech in Computer Science OR Mathematics & Computing only.

- Master's degree in Mathematics/ Applied Mathematics/ Operations Research/Statistics/Comp Sc and Bachelor's degree in Science or Arts with Mathematics/Statistics as one of the subjects or Bachelor's degree with Honours in Mathematics/ Statistics/Applied Mathematics/Operations Research/Comp Sc.

- GATE score in Mathematics only.

Short-listing Criteria for Part Time Applicants:

Category	Undergraduate Degree	Postgraduate Degree
General and OBC	BA/ BSc with 60% or above	MA/MSc with 60% or above
	60% or above or CGPA 6.75 or above out of 10 in 5 year Integrated MSc or MTech	---
	BTech with 70% or above or CGPA 7.5 or above out of 10	---
	BS with 70% or above or CGPA 7.5 or above out of 10	---
SC/ST/PH	BA/ BSc with 55% or above	MA/MSc with 55% or above
	55% or above or CGPA 6.25 or above out of 10 in 5 year Integrated MSc or Mtech	---
	BTech with 65% or above or CGPA 7.0 or above out of 10	---
	BS with 65% or above or CGPA 7.0 or above out of 10	---

- Minimum two years of work experience with GOI/Research Organisations/PSU/Private Industries, at the time of registration.

- Applicants not working in NCR (radial distance more than 50 km from IITD) need to stay in IITD for minimum six months. DRC may specify higher residency requirement based on the courses recommended.

- In case CGPA is not on a 10 point scale then an equivalent scaled criterion will be considered.

- B.Tech. and M.Tech in Computer Science or Mathematics and computing.

- Master's degree in Mathematics/ Applied Mathematics/ Operations Research/Statistics/Comp Sc and Bachelor's degree in Science or Arts with Mathematics/Statistics as one of the subjects or Bachelor's degree with Honours in Mathematics/ Statistics/Applied Mathematics/Operations Research/Comp Sc.

- NOC from current employer at the time of interview.