

Ph.D. in Operational Research

To provide advanced course in Operational Research, with a view to strengthen a student's basic foundations for doing Ph.D. in Operational Research.

Eligibility

- (i) Master's/M. Phil. Degree in Operational Research or allied subjects (provided the candidate has studied at least two papers in Operational Research with 60% or more marks in Operational Research papers) with at least 55% marks in aggregate (or its equivalent grade 'B' in the UGC 7-point scale or an equivalent grade in a point scale wherever grading system is followed).
- (ii) A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/differently-abled.
- (iii) Candidates with Master's or equivalent degree must appear in the written entrance examination conducted by the University in order to be eligible for interview. Based on the performance in the written test, which is the qualifying exam, the shortlisted candidates will be called for the interview.
- (iv) Candidates who have qualified UGC-NET (including JRF)/ UGC-CSIR NET (including JRF), DBT-JRF, ICMR-JRF, DST-INSPIRE or equivalent national level examination/fellowship (as identified by DRC)/ GATE/teacher fellowship holder may directly appear for interview.
- (v) Teachers who are in service in the University of Delhi may directly appear for interview.
- (vi) Candidates holding Junior Research Fellowship or equivalent research options in projects, satisfying the minimum eligibility conditions (subject to selection by duly constituted committee as per the University norms for research projects) may also appear directly for interview.
- (vii) No candidates shall be eligible to register for the Ph.D. programme if he/she is already registered for any full-time programme of study in any University/Institution.
- (viii) Candidates who have cleared the M.Phil. coursework with at least 55% marks in aggregate (or its equivalent grade 'B' in the UGC 7-point scale or an equivalent grade in a point scale wherever grading system is followed) and have successfully completed the M.Phil. degree with at least 55% marks shall be eligible for appearing directly for interview. A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade is allowed for those belonging to SC/ST/OBC (non-creamy layer)/differently-abled.
- (ix) Candidates who have cleared coursework of M.Phil. from University of Delhi with at least 55% marks, in aggregate may directly appear for interview to Ph.D. without completing the M.Phil. Dissertation, if the candidate is interested in registering for Ph.D. without completing M.Phil. programme.
- (x) A candidate whose M.Phil. dissertation has been evaluated and the viva voce is pending may appear directly for interview for the Ph.D. programme.

Note:

- (i) All candidates appearing directly for interview have to register on the online admission portal.
- (ii) All the other eligibility criteria mentioned in the Ordinance VI (amended via notification dated 9th August, 2017) of Ordinances of the University of Delhi related to Doctorate of Philosophy (Ph.D.) are applicable.

Entrance Test and Interview

- (i) The Entrance test will be a qualifying examination with qualifying marks as 50%. The syllabus for the entrance test will consist of 50% questions on research aptitude/methodology and 50% subject-specific questions.
- (ii) The Entrance test for Ph.D. programme will be conducted once in a year and the eligibility of shortlisted candidates shall remain valid till the next entrance test. The interviews may be held twice in a year or more, subject to availability of seats as determined by the DRC.
- (iii) The merit list of the recommended candidates will be displayed on the website after the approval by the DRC. There will be a waiting list in the order of merit.
- (iv) The DRC reserves the right not to select candidates for all the vacancies advertised.
- (v) The registration of candidates in the Ph.D. programme will be confirmed by the BRS based on the recommendation of the DRC after the completion of coursework.

Note:

- (i) There will be a common written examination for both M.Phil. and Ph.D. programmes in Operational Research.
- (ii) No TA/DA will be paid for attending the written test and interview.

No. of Seats

Exact no. of seats will be notified by the department every year. Reservation shall be applicable as per the University rule from time to time.

Syllabus for Ph.D. Entrance Examination

The syllabus for the written examination is from the following areas.

Operational Research: Definition and scope of operations research, Formulation of simple linear programming problems, Simplex method, Duality, Complementary slackness theorem, Simple transportation and assignment problems, Convex functions and their basic properties, Lagrange theorem, KKT optimality conditions, quadratic programming, Characteristics of Inventory system, Simple economic lot size inventory models with and without shortages, Economic production quantity model, Reorder level, Simple single period stochastic inventory model, Definition of Queues and their characteristics, Queueing models with

Markovian input and Markovian service, M/M/1 & M/M/C queueing models, Definitions of reliability and availability, Reliability of multi components systems, Failure time distributions- exponential and weibull.

Research Methodology: Criteria of good research, Ethical issues in research such as plagiarism, falsification, integrity and misleading authorship, Statistical measures, Measurement and scaling techniques, Probability, Conditional Probability, Theorem of total probabilities, Bayes Theorem, Random variables, Sampling fundamentals, Sampling distributions, Sampling theory, Estimation, Testing of hypothesis, Correlation and regression.