

DEPARTMENT OF STATISTICS

Faculty of Science

D.Phil. Course Work in Statistics

To be implemented from July 2012

1. The student admitted in the Department in the D.Phil. Program will be required to pass a Course Work of minimum of 30 credits.
2. The structure of the course work is as follows:

| Course Code | Name of Course | Credits (L-T-P-C) |
|-------------|---|-------------------|
| STADC701 | Advanced Research Methodology | 3-0-3-12 |
| STADC702 | Research seminar, Communication and IT skills | 0-1-3-6 |
| | Option 1 | 3-0-0-6 |
| | Option 2 | 3-0-0-6 |

L: Lectures; T:Tutorial; P: Lab work; C: Credits

3. All the scholars will be required to clear the coursework in one semester and there will be no extension.
4. Each research scholar will be required to prepare and present a review paper which will be evaluated by the board of examiners. The review paper will be of 6 credits.
5. The research scholar will be required to opt for TWO specific courses of 6 credits each suggested by research supervisor and Doctoral Program Committee (DPC). The DPC can suggest the research student to opt some equivalent course run by other department.
6. Each theory paper will be of 100 marks and 3 hours duration.

Curriculum for pre D.Phil. Programme in Statistics

STADC 701: Advanced Research Methodology (12 credits)

(i) Computer Intensive Statistical Methods (6 credits)

Optimization: Newton-Raphson algorithm, EM algorithm with applications to missing/ incomplete data problems and mixture models, minorization maximization algorithm.

Monte Carlo simulation: inversion method, rejection method, sampling/importance resampling method, stochastic representation method, conditional sampling method, vertical density representation method, Markov Chain Monte Carlo Methods, Gibbs sampling for multivariate simulation

Numerical Integration: Laplace approximation, Riemannian simulation, importance sampling method

Jackknife and cross validation.

Reading Material:

1. G.S. Fishman, 1996, Monte Carlo: Concepts, Algorithms, and Applications, Springer.
2. Ming T Tan, Guo-Liang Tian and Kai Wang Ng, 2010, Bayesian Missing Data Problems, CRC Press Chapman and Hall.
3. Debashish Kundu and A. Basu, 2004, Statistical Computing, Existing Methods and Recent Developments, Narosa, New Delhi.

(ii) Review Paper (6 credits): All D.Phil. students will be required to write a review paper and research plan proposal and submit it. He also has to make an oral presentation of his review paper before the board of examiners.

STADC 702: Research Seminar, Communication and IT Skills (6 credits): The objective of this course is to develop communication skills in research, writing reports and research publications, working co-operatively in team and presentation of projects through seminars. To fulfill the objective, use of information and computer systems learning is essential and the students must learn standard office productivity software tools such as Microsoft office, and other software of scientific type settings (latex, scientific workspace etc.).

Discipline Specific Courses (6 Credit each)

Each research scholar will be required to opt for TWO discipline specific courses of 6 credits each suggested by the research supervisor/ DPC. The DPC can suggest the research student to opt some equivalent course run by other department. Keeping in view the requirements of the D.Phil. students, the detailed course content of each opted course will be decided by the DPC and announced by the department before the beginning of course work.

STDC703: Advance Inference procedures in Linear Models

STDC704: Advance Time Series Analysis

STDC705: Nonparametric methods and Outliers Detection

STDC706: Statistical Quality Control

STDC707: Distribution Theory and Bayesian Inference

STDC708: Reliability Analysis

STDC709: Programming with R