

STATS 3006 Mathematical Statistics III
General Information
26 February 2007

Lecturer: Dr Patty Solomon
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Lectures: Mondays, Tuesdays and Thursdays at 12.10 pm, all in G08.

Tutorials: Thursdays 12.10pm in G08, Even Weeks Only.

Assignments: Four assignments, due noon Friday 16 March, 4 pm Thursday 5 April, noon Friday 11 May, noon Friday 1 June. Your best three assignment marks will count towards the final assessment.

Assessment: 3-hour written Exam, 80% or 100%; Assignments 20% or 0% (whichever gives the higher final mark).

References:

1. J.A. Rice (2007) *Mathematical Statistics and Data Analysis*, 3rd Edition, Duxbury Advanced Series, Thompson/Brooks/Cole. Includes CD-ROM datasets.
BSL Main Collection 519.221 R496m.3; also available from the Reserve Desk, and a copy is available for short-term loan.
Multiple copies of the second edition are also available for short and long-term loan.
2. G. Casella and R.L. Berger (2002) *Statistical Inference*, 2nd Edition. Thomson Learning, Duxbury.
BSL Main Collection 519.231 C337s.2 (Also in Reserve Collection.)
3. S.D. Silvey (1975) *Statistical Inference*, Chapman & Hall.
BSL Main Collection 519.2 S587
4. N.L. Johnson, S. Kotz and A.W. Kemp (1992) *Univariate Discrete Distributions* 2nd Edn., Wiley (New York).
BSL Main Collection 519.224 J68u
5. N.L. Johnson, S. Kotz and N. Balkrishnan (1994) *Continuous Univariate Distributions* 2nd Edn., Wiley (New York).
BSL Main Collection 519.224 J68c

Course Outline

Distribution Theory

1. Discrete and continuous distributions.
2. Moments and moment generating functions.
3. Review of some commonly occurring univariate distributions.
4. Multivariate Distributions.
5. Marginal and distributions.
6. Conditional expectations and variances.
7. Transformations of random variables.
8. The multivariate normal distribution.
9. Distributions related to the normal.

Limit Theorems

1. The weak law of large numbers.
2. Convergence in distribution.
3. The central limit theorem.

Estimation

1. Bias and mean squared error.
2. Minimum variance unbiased estimation.
3. Exponential families.
4. Sufficiency.
5. Method of moments.
6. Maximum likelihood estimators.

Hypothesis Tests and Confidence Intervals

1. The Neyman-Pearson Setting.
2. The Wald test.
3. The Score test.
4. Likelihood ratio tests.
5. Optimal tests.