**Course:** **MATH 2P82 (MATHEMATICAL STATISTICS)**
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# Topics to be covered

**Transforming Random Variables**: Univariate and bivariate case. Chi-square, Cauchy, Student's and Fisher's Distributions.

**Random Sampling:** Sample mean, Central Limit Theorem. Sampling from Normal distribution, $P^2$, t and F distributions. Sampling without replacement. Bivariate Sampling.

**Order Statistics:** Univariate case, sample median. Bivariate case, sample range.

**Parameter Estimation:** Cramer-Rao inequality, efficiency, sufficiency. Method of moments. Maximum-likelihood technique.

**Confidence Intervals** for: population mean, difference between two means, proportion, variance.

**Hypothesis Testing** concerning: mean, proportion, variance. Contingency tables. Goodness-of-fit test.

**Linear Regression:** Simple regression, least-square technique, normal equations. Estimation of regression coefficients, corresponding confidence intervals. Correlation coefficient. Multivariate regression.

**Analysis o Variance:** One-way ANOVA. Two-way, with and without interactions.

**Nonparametric Tests**: Sign test. Signed-rank test. Rank-sum tests, Mann-Whitney, Kruskal-Wallis. Run test.

**Textbooks:** **MATH 2F82 LECTURE NOTES,**
**John E. Freund, MATHEMATICAL STATISTICS, Prentice Hall**

**Marking Scheme:** **Nine assignments - 24%**
**Two Midterms b - 18% each**
**Final Exam - 40%**