# MECO 6315
# Wednesday Night
# Spring 2009

**Instructor:**

**John J. Wiorkowski, Professor of Statistics**
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**Office Hours:**

**MA 3.208 Mondays and Wednesdays 5:00 – 6:45**
**Otherwise by Appointment**

**Text:**

**Statistical Models, Davison, Cambridge University Press 2003.**

**Student Learning Objectives/Outcomes:**

1) **Be familiar with the characteristics of Probability Distributions used in Business Research**
2) **Be able to apply Multiple Methods of Estimation to obtain estimates of Distribution Parameters based on Empirical Data**
3) **Be able to obtain intervals on Parameter Estimates**
4) **Be able to fit both Linear and Non-linear Regression Models**
5) **Be able to fit models to discrete data**
6) **Be able to fit models with non-normal and correlated errors**

**Grades:**

**Course grade is based on the weighted average of weekly assignments. There are no midterm exams nor is there a final exam.**

**Computing:**

**Weekly assignments will typically require some use of computer facilities. You should be familiar with some package which can do statistical computation.**

**Examples are SAS, MATHEMATICA, SYSSTAT, etc. No one package is mandated for use in the course.**

## Tentative Class Schedule

| | |
|---|---|
| **Week 1** | **January 14** |
| **Week 2** | **January 21** |
| **Week 3** | **January 28** |
| **Week 4** | **February 4** |
| **Week 5** | **February 11** |
| **Week 6** | **February 18** |
| **Week 7** | **February 25** |
| **Week 8** | **March 4** |
| **Week 9** | **March 11** |
| **Spring Break** | **March 18** |
| **Week 10** | **March 25** |
| **Week 11** | **April 1** |
| **Week 12** | **April 8** |
| **Week 13** | **April 15** |
| **Week 14** | **April 22** |
| **Week 15** | **April 29** |

# Topics

**(Topics will be covered in the order shown below)**

| | Topics: (In Order) | | Text Section |
|---|---|---|---|
| I | Models for Data: | | |
| | Properties of Distributions | | Chapter 2 |
| | | Moments | |
| | | Characteristic Functions | |
| | | Cumulant Function | |
| | Common Distributions | | various |
| | | Normal, $\chi^2$,t,F,exponential, | |
| | | gamma, beta,uniform | |
| | | binomial, poisson, hypergeometric, | |
| | Families of Distributions | | various |
| | | Pearson | Not |
| | | Burr | all |
| | | Richards and Johnson | in |
| | | Exteme Value | text |
| | | Exponential Family | |
| | | Stable | |
| | Special Distributions | | various |
| | | Weibull | Not |
| | | Logistic | all |
| | | Multivariate Normal | in |
| | | Dirichlet | text |
| II | Simulation and Numerical Integration: | | |
| | Generating random variables | | 3.3 |
| | Acceptance Method | | |
| | Numerical Integration (moments, percentiles) | | |
| | Gibb's Sampler | | |
| III | Point Estimation: | | Chapters |
| | Method of Moments | | 4 and 11 |
| | Jack Knife | | |
| | Delta Method | | |
| | Maximum Likelihood | | |
| | Sufficiency | | |
| | Factorization Theorem | | |
| | Asymptotics | | |
| | Consistency | | |
| | Bias MVUE BLUE | | |
| | Efficiency | | |
| | Cramer-Rao Lower Bound | | |
| | Bayes | | |
| | Minimum Mean Square | | |
| | Loss Function | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | Text Section |
| | | | | | | |
| IV | Hypothesis Tests: | | | | | |
| | | Likelihood Ratio | | | | Chapter 7 |
| | | Power | | | | and 11 |
| | | Bayesian | | | | |
| | | | | | | |
| V | Estimation Interval: | | | | | Chapter 7 |
| | | Confidence Interval | | | | |
| | | Bayes | | | | |
| | | Credible Region | | | | |
| | | Union Intersection Principle | | | | |
| | | Bootstrapping | | | | |
| | | | | | | |
| VI | Statistical Models Continuous: | | | | | Chapter 8 |
| | | Linear Regression | | | | |
| | | Step-wise Regression | | | | |
| | | Non-linear Regression | | | | Chapter 10 |
| | | Exponential Family | | | | |
| | | ANOVA (Fixed, Random and Mixed) | | | | Chapter 9 |
| | | Survival Curves | | | | 5.4 |
| | | Time Series | | | | 6.4 |
| | | | | | | |
| VII | Statistical Models Discrete: | | | | | |
| | | Poisson Regression | | | | 10.5 |
| | | Logistic Regression | | | | 10.4 |
| | | Geralized Least Squares | | | | 10.3 |
| | | Log-linear Models | | | | |
| | | | | | | |
| VIII | Multivariate Models (If time available) | | | | | |
| | | Discriminant Analysis | | | | Not |
| | | MANOVA | | | | in |
| | | Multivariate Regression | | | | Text |
| | | | | | | |