

## **Statistics and Linear Models**

### **exam scope**

#### **Lecture 1**

Definition of: likelihood function, log-likelihood function, maximum likelihood estimator, Fisher information. Knowing and understanding of: Theorem 2, Corollary 1.

#### **Lecture 2**

Definition of: efficiency of an estimator. Knowing and understanding of: Theorem 1, Corollary 1, Theorem 2.

#### **Lecture 3**

Definition of: asymptotic efficiency of an estimator, minimum variance unbiased estimator, sufficient statistic.

#### **Lecture 4**

Knowing and understanding of: factorization theorem, Rao-Blackwell theorem, Theorem 2.

#### **Lecture 5**

Definition of: complete statistic, regular exponential class (also positive and negative example of regular exponential class). Knowing and understanding of: Lehmann-Scheffé theorem, Theorem 2.

#### **Lecture 6**

Section 1: Definitions 3-10. Section 2: Definition 1, Theorem 1, and Corollary 1.

#### **Lectures 7 and 8**

Definition of: family with monotone likelihood ratio, likelihood ratio test. Knowing and understanding of Karlin-Rubin Theorem.

#### **Lecture 9**

Definition of: (asymptotic) likelihood ratio test, Rao score test, Wald test. Knowing and understanding of Theorem 1.

#### **Lecture 10**

Definition of Fisher information matrix.

#### **Lecture 11**

Definition of models and related statistics from Remarks 1-3. Knowing and understanding of Theorem 1 (distribution of quadratic forms).

#### **Lecture 12**

Definition of a one-way ANOVA model and the solution (a form of the test statistic).