



**INSTRUCTION DIVISION**  
**FIRST SEMESTER 2016-2017**  
**Course Handout (Part II)**

Date: 02.08.2016

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

**Course No.** : MATH C353 / MATH F353  
**Course Title** : Statistical Inference and Applications.  
**Instructor-in-charge** : CHANDRA SHEKHAR

**1. Scope and objective of the Course:**

The course deals with some of the statistical techniques of decision-making. Test of hypotheses, both parametric and nonparametric methods will be discussed. Comparison of two treatments will be discussed. Comparison of several treatments using analysis of variance will be dealt with. Control charts for measurements and attributes will also be discussed.

**2. Text Book:**

Venkateswaran, S., & B. Singh, Operations Research, Notes-EDD, Vol.1 and 2, 1997.

**3. Reference Books:**

Devore JL, Probability and Statistics for Engineering and the Sciences, 5<sup>th</sup> ed., Thomson, 2000

**4. Course Plan:**

Lect.	Topic	Ref. to Text Book (Chapter)
1-4:	<u>Review of Elements of Probability Theory and Statistical Concepts.</u>	Chapter 1
5-15:	<u>Classical decision theory (Tests of Parametric hypotheses).</u>	Chapter 2
Lect. 1:	Classification of hypotheses as simple and composite, Distributional and parametric hypotheses. Examples	
Lects.2-3:	Hypothesis testing in General Terminology	2.1 to 2.4
Lects.4-5:	Neymann Pearson's lemma, BCR (Simple vs. Simple hypotheses)	2.5, 2.5.1
Lects,6 -8:	UMPCR (Simple vs composite, composite vs composite). Monotone likelihood ratio and its application.	2.5.2-2.5.3
Lects 9-10:	GLRT (No derivation of GLRT need to be discussed. One example of derivation of GLRT, given in the book may be explained.) Use of various tests based on GLRT without derivation.	2.6, 2.7
Lect.11:	Approximate tests, paired t-test (Omit the derivations of GLRT but the results to be applied to numerical problems)	





16 to 24: <u>Classical Decision Theory (Non- parametric hypotheses)</u> :	Chapter 3
Lect.1 Testing of hypotheses about multinomial probabilities.	2.8
Lects.2-3: Applications of the test in lect.1 (above) to distributional hypotheses and the resulting Chi-Square test of goodness of fit.	3.2, 3.3
Lect.4: Kolmogorov-Smirnov one sample test.	3.4
Lects.5-6: Chi-Square test for independence and homogeneity	3.5, 3.6
Lect.7: Wilcoxon's test	3.7, 3.8, 3.8.2
Lect.8-9: Sign test, Signed rank-sum test	3.9, 3.9.1, 3.9.2
25 to 34: <u>Analysis of Variance and Design of Experiments.</u>	Chapter 4
Lects. 1-3: Introduction and one-way classification (Fixed Effects Model)	4.1, 4.2 4.3,4.3.1
Lect.4-6 : Randomized Block Design for one way classification, two-way classification (one observation per cell-interaction absent.)	4.3.3 and 4.4
Lects.7-8: Latin Square Design and missing values	4.5 & 4.6
Lects. 9-10: Test for testing the equality of variances	4.7
35-40 <u>Statistical Quality Control</u>	Chapter 5

### 5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Venue	Remarks
Mid Sem. Test	90 mts.	35	7/10 2:00 - 3:30 PM		CB
Quiz /Assignment/ Seminar		20	To be announced		
Compre. Exam.	3 hrs	45	12/12 FN		Partially CB and OB

**5. Chamber Consultation Hour:** will be announced in the class.

**6. Notices:** Notices concerning the course will be displayed on the **NALANDA** only.

**Instructor-In-Charge**  
**MATH F353**

