UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DEPARTMENT: Mathematics **DATE: July 1994**

Math 420	Empirical & non-parametric statistics	3
NAME & NUMBER OF COURSE	DESCRIPTIVE TITLE	UCFV CREDIT

CATALOGUE DESCRIPTION: Empirical and non-parametric statistics are used when either little can be assumed about the underlying distribution or it is very complex. These are methods based on order statistics, rankings, or resampling: and are very useful when a relatively quick answer is required.

COURSE PREREQUISITES: Math 211, 270. Math 221 and at least two upper-level Math courses recommended.

COURSE COREQUISITES: None

HOURS PER TERM FOR EACH STUDENT	Lecture	60 hrs	Student Directed Learning		hrs
	Laboratory	hrs			
	Seminar	hrs	Other - specify:		
	Field Experience	hrs			hrs
			TOTAL	60	HRS

UCFV CREDIT TRANSFER	UCFV CREDIT NON-TRANSFER	NON-CREDIT

TRANSFER STATUS (Equivalent, Unassigned, Other Details)

UBC credits

SFU credits

UVIC units

Other

Math Curriculum Committee	J.D. TUNSTALL Ph.D.
COURSE DESIGNER	DEAN OF ACADEMIC STUDIES

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COURSES FOR WHICH THIS IS A PREREQUISITE:	**RELATED COURSES**
none	

TEXTBOOKS, REFERENCES, MATERIALS **(List reading resources elsewhere)**

TEXTS: **Jean D. Gibbons & S. Chakraborti. Nonparametric statistical inference (3rd edition). Marcel Dekker (1992)**

V. Choulakian, R.A. Lockhart, M.A. Stephens. Cramer-von Mises statistics for discrete distributions. *The Canadian Journal of Statistics*, 1994, 125-137.

OBJECTIVES:

The course is designed to introduce the students to a range of techniques that do not conveniently fall into one of the standard schools of inference. It will enable the students to:

1. **develop a theoretical framework for use of order statistics and the empirical distribution function;**
2. **become familiar with the inference methods using these tools;**
3. **meet the inference methods based on randomization and rank-randomization;**
4. **become acquainted with the bootstrap and jacknife methods of resampling to obtain variance estimates;**
5. **meet simple standard measures of bivariate association.**

STUDENT EVALUATION PROCEDURE:

Assignments	**20%**
Midterm exams	**40%**
Final exam	**40%**

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COURSE CONTENT

1. **Review of joint probability distribution theory and transformations.**

2. **The distribution of the empirical distribution function, order statistics.**

3. **Quantile point and interval estimation, tolerance limits.**

4. **Kolmogorov-smirnov statistics, and Cramer-von Mises, Watson and Anderson-Darling tests of fit. Durbin's method for allowing for adjustable parameters or, equivalently, components of the statistics.**

5. **Fisher-Pitman randomization and rank-randomization methods, especially the Wilcoxon and Kruskall-Wallis tests.**

6. **Bivariate association, rank correlation, Kendall's tau, concordance.**

7. **Efron's bootstap techniques.**

8. **The Quenouille-Tukey jacknife methods for obtaining standard errors.**