St. Francis Xavier University
Department of Mathematics, Computing and Information Systems
Math 232 - Statistical Methods

Instructor: Aaron Childs
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Office Hours:

	Monday	Tuesday	Wednesday	Thursday	Friday
8:15-9:15	Math 110			Math 232	
9:15-10:15				Office Hours	Office Hours
10:15-11:15		Math 232	Math 110	Office Hours	Office Hours
11:15-12:15				Math 110	Math 232
12:15-1:15					
1:15-2:15	Math 231	Office Hours	Math 231	Math 231	
2:15-3:15	Office Hours	Office Hours	Office Hours	Office Hours	
3:15-4:15	Office Hours		Office Hours		
4:15-5:15					

COURSE INFORMATION

Lectures: Tuesdays 10:15, Thursdays 8:15, and Fridays 11:15

Labs: Mondays and Wednesdays at 2:15 in Xavier Hall 126
Thursdays at 2:15 and Fridays at 12:15 in Nicolson Hall 22

Textbook: *Fundamentals of Biostatistics*, Fourth Edition by Bernard Rosner. Duxbury Press

Calculators: Any calculator can be used on the tests and exam.

Formula Sheet: Some formulas will be given on the tests and exam.

Assignments: There will be six assignments, due anytime before 12 noon on the following
dates:

Assignment #1: Due on Wednesday January 22
Topics: Chapter 9 - Multisample Inference, Analysis of Variance
- Review of the Two-Sample t-Test, and One-way Analysis of Variance
- Pairwise comparisons - Bonferroni T-tests
- Testing contrasts
- Randomized complete block design - Hypothesis testing, effectiveness of blocking and paired comparisons

Assignment #2: Due on Wednesday February 5
Topics: More Experimental Design

- The crossover design
- Checking the assumptions: residual analysis
- Two-factor analysis of variance - Hypothesis testing and paired comparisons
- 2^k Factorial experiments
- 2^k Factorial experiments in an Incomplete Block Design, Confounding

Assignment #3: Due on Wednesday February 19
Topics: Chapter 10 - Hypothesis Testing for Categorical Data

- Two sample test for binomial proportions
- Measures of effect for categorical data
- Chi-Square test, and Fisher's Exact Test
- Chi-Square Goodness of Fit Test
- $R \times C$ Contingency Tables: $R \times C$ test for independence, $R \times C$ test for homogeneity.
- Confounding and Standardization
- Methods of inference for stratified categorical data - The Mantel-Haenszel Test

Assignment #4: Wednesday March 12
Topics: Chapter 11 - Simple Linear Regression and Correlation

- Fitting Regression Lines - The Method of Least Squares
- Inferences About Parameters from Regression Lines
- Prediction Intervals and Confidence Intervals
- Assessing the Goodness of Fit of Regression Lines
- Repeated Measures and Lack of Fit
- Residual Analysis - Checking for Normality
- The Correlation Coefficient
- Statistical Inference for Correlation Coefficients - Interval Estimation and Hypothesis Tests
- Coefficient of Determination

Assignment #5: Wednesday March 26
Topics: More Chapter 11 - Multiple Regression

- Multiple Regression - Interval Estimation, Hypothesis Testing, Prediction and Confidence Intervals on a Predicted Response, Testing a Subset of Predictor Variables
- Criteria for variable selection - Forward Selection Method, Backward Elimination Procedure and Stepwise Method
- Use of Indicator or "Dummy" Variables, Confounding and Interaction in Regression
- Polynomial Regression
- Model Transformations
- Two-way analysis of Variance
- The Intraclass Correlation Coefficient
- Partial and Multiple Correlation

● Multiple Logistic Regression

Assignment #6: Wednesday April 9
Topics: Chapter 12 - Nonparametric Methods

● Nonparametric alternatives to the one-sample t-test: Sign test for the Median, and Wilcoxon Signed-Rank Test

● The nonparametric two-sample t-test and paired comparison design: Wilcoxon Rank-Sum Test and Wilcoxon Signed Rank Test for Paired Observations

● Nonparametric one-way ANOVA: Kruskal-Wallis Test, Dunn procedure for comparing specific groups under the Kruskal-Wallis Test

● Nonparametric alternative to the Randomized Block Design: Freidman Test

Labs: There will be six labs, to be handed in with Assignments 1-6 respectively, and to be held the week of:

Lab #1: The week of January 13 to 17
Lab #2: The week of January 27 to 31
Lab #3: The week of February 10 to 14
Lab #4: The week of March 3 to 7
Lab #5: The week of March 17 to 21
Lab #6: The week of March 31 to April 4

Tests and Final Exam: The tests and exam will be on the following dates:

Test #1:   Tuesday February 11
Test #2:   Tuesday March 18
Final Exam: To be determined

Course Evaluation:

Assignments/Labs:	20%
Test 1:	20%
Test 2:	20%
Final Exam:	40%