Course Syllabus MTH 481: Applied Probability & Statistics Fall Semester 2005

Course:

Title : MTH481 – Applied Probability & Statistics

Section: 101

CRN : 3209; Credit Hours: 3

Classes : Lectures - MWF 01:00 - 01:50 p.m.; SH 514

Instructor:

Dr. Alfred Akinsete Office: Morrow Library – ML105 Phone number 696 3285 Email Address – <u>akinsete@marshall.edu</u>

Office Hours:

MW 10:00 a.m. – 12:30 p.m. T 1:00 p.m. – 3:00p.m., & Any other time by appointment

Prerequisites: Prerequisites : MTH 230 or Permission

Recommended Textbook:

Statistics for Engineers and Scientists by William Navidi (2006)

Additional Textbooks (Not recommended):

Milton, J. S. and Arnold C. J. (2003). *Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences* (4th ed.), New York: McGraw Hill

Ross, S (2004). *Introduction to Probability for Engineers and Scientists*. (3th ed.), Massachusetts: Elsevier, Academic Press.

Course Objectives:

This course is designed to introduce undergraduate students in Science and Engineering to the applications of probability, and statistical methods and modeling. Presentation of theories will be at the minimum. The course is aimed at providing students with the following:

- a clear understanding of the descriptive statistics
- a strong foundation in statistical methods, modeling and propagation of error.
- understanding of various discrete distributions and their applications
- a strong knowledge of the continuous distributions and their applications.
- a strong foundation and adequate understanding of statistical inference, including hypothesis testing and estimation of parameters.
- a strong foundation in regression analysis
- a strong foundation in experimental design
- a strong foundation in the distribution-free statistics.

Attendance

Students are expected to attend all scheduled classes. It is the student's responsibility to find out what was discussed in a missed class. Although, attendance records will not be used to compute grades (except possibly in borderline cases), however, missing classes can be expected to significantly reduce your chances of success.

Homework

Homework problems will be collected and graded. Make it a habit to do your homework the same day they are assigned, and ensure to submit your homework as at when due. Submission within 24 hours from when it is due will be based on 80% of full credit. No late submission will be accepted after 24 hours from when it is due. You are welcome to collaborate with other students on homework, although you must turn in your own work, and written in your own style and words. Solutions to problems must be made clear and neat. In cases where solutions require explanation and derivation, a one-number solution will not be accepted.

Testing and Grading

All tests will be given during the regular class sessions. No makeup quiz (if any) will be given under any circumstance. Also, no makeup test will be given unless an acceptable excuse is given to the instructor, for example, in the case of illness, a note from a physician. All schedules tests and examination will be conducted in the classroom.

The final grade will be based on the following components:

3 Tests300 pointsHomework Exercises100 pointsFinal Examination100 pointsTotal500 points

The semester grade will be based on the percentage of the 600 total possible points, using the following scale.

90 -100%	A
80 - 89%	B
70 - 79%	C
60 - 69%	D
0 - 59%	F

FINAL EXAMINATION: Friday, December 09 [12:45 p.m. – 2:45 p.m.]

MTH 481: STATISTICS FOR ENGINEERS AND SCIENTISTS

The following is a tentative instructional guide, and it is subject to modification as class progresses:

Chapter 1: Sampling and Descriptive Statistics Sections 1.1-1.3 Week 1 1.1 Sampling **1.2 Summary Statistics 1.3 Graphical Summaries Chapter 2: Probability** Sections 2.1-2.5 Week 2 - Week 4 2.1 Basic Ideas 2.2 Counting Methods 2.3 Conditional Probability and Independence 2.4 Random Variables 2.5 Linear Functions of Random Variables Test 1 **Chapter 3: Propagation of Error** Sections 3.1-3.4 3.1 Measurement Error 3.2 Linear Combinations of Measurements 3.3 Uncertainties for Functions of One Measurement 3.4 Uncertainties for Functions of Several Measurements

Chapter 4: Commonly Used Distributions

Sections 4.1-4.3, 4.5, 4.10 4.1 The Bernoulli Distribution 4.2 The Binomial Distribution 4.3 The Poisson Distribution 4.4 Some Other Discrete Distributions 4.5 The Normal Distribution 4.7 The Exponential Distribution 4.10 The Central Limit Theorem Test 2

Chapter 5: Confidence Intervals

Sections 5.1-5.7

- 5.1 Large-Sample Confidence Intervals for a Population Mean
- 5.2 Confidence Intervals for Proportions
- 5.3 Small-Sample Confidence Intervals for a Population Mean
- 5.4 Confidence Intervals for the Difference Between Two Means
- 5.5 Confidence Intervals for the Difference Between Two Proportions
- 5.6 Small-Sample Confidence Intervals for the Difference Between Two Means
- 5.7 Confidence Intervals with Paired Data

Week 7 - Week 9

Week 5 - Week 6

Week 9 - Week 11

Chapter 6: Hypothesis Testing

Sections 6.1-6.8	Week 11 - Week 13	
6.1 Large-Sample Tests for a Population Me	an	
6.2 Drawing Conclusions From the Results of	of Hypothesis Tests	
6.3 Tests for a Population Proportion		
6.4 Small-Sample Tests for a Population Me	an	
6.5 Large-Sample Tests for the Difference Between Two Means		
6.6 Tests for the Difference Between Two Pr	roportions	
6.7 Small-Sample Tests for the Difference Between Two Means		
6.8 Tests With Paired Data		
6.10 The Chi – Square Tests		
Test 3		
Chapter 7: Correlation and Simple Linear Regre	ssion	
Sections 7.1, 7.2	Week 14	
7.1 Correlation		
7.2 The Least-Squares Line		

Review for Final Examination

Week 15

Depending on how fast we are able to move through the syllabus, we could consider going through the following additional (but optional) topics, in the order that is deemed necessary:

Chapter 7: Correlation and Simple Linear Regression

7.3 Uncertainties in the Least-Squares Coefficients

7.4 Checking Assumptions and Transforming Data

Chapter 8: Multiple Regression

8.1 The Multiple Regression Model

8.2 Confounding and Collinearity

Chapter 9: Factorial Experiments

9.1 One-Factor Experiments

9.2 Pair-wise Comparisons in One-Factor Experiments

9.3 Two-Factor Experiments