MA 495 - Special Topics in Applied Statistics: Multivariate Analysis, Generalized Linear Modeling and Time Series

MA495 Fall 2013

Professor: Dr. Olga Hocking
Office: NSF 1009
Email: opendlet@nmu.edu
Office Hours*: M,W,R,F 1:00-5:00, T 9:00-12:00
*appointments must be made via e-mail in advance; other hours available


Course description: Statistics is the language of numbers. In this class you will learn advanced statistical data analyses which are not routinely covered in an introductory stat course like MA171. It is a companion or continuum class to MA492, Multiple Regression analysis and Analysis of Variance (ANOVA). The first third of this class will contain a brief review of the methods in MA492, so MA492 is not necessarily a prerequisite to this course. Since multivariate and Generalized Linear Modeling require the same basic concepts and tools covered by regression and ANOVA, this material is fundamental to both courses. Students will be required to present, orally and written, a completed data analysis project incorporating the methods covered in this class. Most of the course grade will revolve around the final project. Students in the process of thesis research may find this course useful in conjunction with their theses. Emphasis in this class is on application of statistical methods with supporting theoretical concepts presented as needed.

Learning objectives: Extensions of applied statistical methods beyond those included in courses such as MA171, MA371, and MA472 will be included in a two-part series. Part I will focus on multivariate methods including principal component analysis, cluster analysis, discriminant analysis, variance component, canonical correlation, factor and spatial analysis. Part two will include extensions of modeling methods to include time series analysis, logistic and probit regression, survival analysis and loglinear (categorical) data methods. Computational software will include Excel, SPSS and R to analyze data and interpret findings. Emphasis will be on the analysis and interpretation of research data with specific applications to the disciplines of biology, business and economics, medicine, sociology and psychology. Advanced undergraduate students and graduate students using statistical methods in their research and teaching will profit from this course. Graduate students in the process of thesis research will receive additional direction towards their research objective. Specific assignments will be allocated aimed at meeting their specific research goals. A basic statistics course such as MA171 is a prerequisite and at least one other statistics course (MA371, MA472, NE512, BI452) are strongly recommended though not required. Upon completion of this course, students will be able to:

- understand the difference between descriptive statistics and inferential statistics
- determine sample spaces and find the probability of an event
- summarize a set of data numerically and graphically
- formulate and test hypotheses about parameters for both one and two populations for both population means and proportions
- construct and interpret confidence interval estimates for population parameters

Evaluation of these learning outcomes will be done through homework assignments, quizzes and exams.

**Grades:**

Lass Project written and oral presentation.

**Disability Services**

If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Dean of Students Office at 2001 C. B. Hedgcock Building (227-1700). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

This course satisfies the Formal Communication Studies requirement.

This course is designed to introduce students to the ways in which information and ideas are expressed using a communication system other than English. Such courses should foster the student's ability to conceptualize and communicate in an orderly, rational manner. Characteristics of a communication system include: 1) possession of a grammar; 2) operation from an established set of rules; 3) reasoning properties such as deduction, inference drawing and problem solving. This includes courses in languages and those in which the central focus of the course is on statistics, computers or formal logic.

*This syllabus is subject to change with notice.*