Overview of Statistics Courses (STAT 53XX)

The only courses that are usually appropriate for students from outside Math & Stat (non-Stat majors) are 5302-5303 (Applied Statistics I & II, non-physical science majors), and 5384-5385 (Statistics for Engineers, physical science majors). 5302-03 has no prerequisites. 5384-85 has Calculus III as a prerequisite. Both focus on learning how to analyze data; little attention is paid to the underlying theory of mathematical statistics (much less attention in 5302-03 than in 5384-85). Upon completion of any one of these (terminal) sequences, the student is eligible for a Masters-level Minor in Statistics (6 hours is the requirement).

Students wanting to take any other STAT course (call them "major stat courses" or MSCs for short) will come up against the formidable barrier of 5328-29 (Mathematical Statistics) as a prerequisite! This rigorous sequence, which relies on a sound knowledge of advanced calculus, delves into the theoretical underpinnings of probability theory, random variables, sampling distributions, theory of point and interval estimation, and hypothesis testing. This is needed because all MSCs focus on the theory of the particular methodology being covered by that course, and 5328-29 is a common necessary tool to understand that theory. For example, 5379 (Time Series) focuses on the theory of ARMA model based inference. Students taking this course will understand both the theory and how to apply it, but the theory is the main focus.

So, MSCs are really only appropriate for Stat majors (MS, PhD). Occasionally we have a non-Stat major wanting to take an MSC. This is unusual because the student will have to first spend a year taking 5328-29 (assuming they have the required calculus background). It may however be appropriate in certain exceptional cases. For example, a student doing a PhD in civil engineering chooses a dissertation topic which requires him/her to understand the intricacies of time series models, so that he/she can develop a suitably modified model to apply to a new situation not covered by existing models. An option available to such non-Stat majors is to get a PhD-level Minor in Statistics (15 hours and special approval are required).

Syllabus for STAT 5302: Applied Statistics I: Introduction to Statistical Methodology

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5302. Applied Statistics I (3). Prerequisite: Consent of instructor. Graphical presentation of data, histograms, sampling methods, basic notions of probability and random variables, one-sample and two-sample inference, hypothesis testing and confidence intervals, one-way analysis of variance, multiple comparison procedures. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384-85.

Syllabus for STAT 5303: Applied Statistics II: Regression and Design of Experiments

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5303. Applied Statistics II (3). Prerequisite: STAT 5302. Basic principles of design of experiments, two-way analysis of variance and covariance, simple regression and correlation, multiple regression, generalized linear models, confounding, block designs, split-plots, nesting, fixed and random effects, repeated measures, linear mixed models. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384-85.