STATISTICS 3520
EXPERIMENTAL DESIGN I

Design of experiments is a global term that includes both the formal design of an experiment and the method of analysis of variance by which the result of the experiment is analyzed. Design is concerned with the proper procedures for collecting the data for analysis. The analysis of variance allows for the testing of whether the means of two or more populations are equal.

In the diagram to the right we have a plot of blood pressure values with respect to both type of disease and type of drug used to control blood pressure. This data was collected under a two-way completely randomized analysis of variance design. An analysis of variance would permit us to test if average blood pressure associated with a disease-drug combination is the same for all combinations.

A smoothed plot of change in blood pressure after one of four types of drugs is taken.

The methods of experimental design are widely used in all fields where experimentation is carried out including the fishery, forestry, engineering, the life sciences, industry and business.
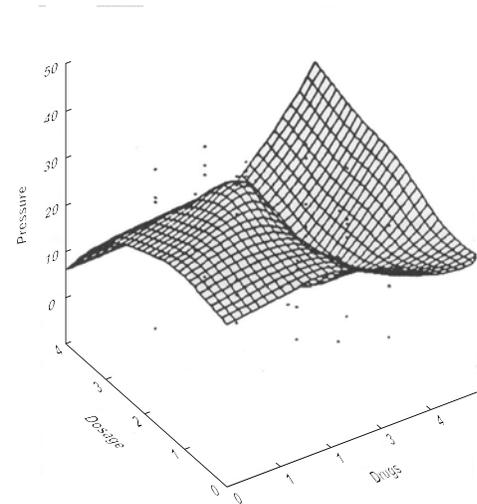
Text. There are many fine books on this subject. One is *Design and Analysis of Experiments* by D.C. Montgomery.

Calendar description. **3520 Experimental Design I** is an introduction to basic concepts in experimental design, including principles of experimentation; single factor designs such as completely randomized designs; randomized block designs; Latin square designs; Graeco Latin square designs; multiple comparison tests; analysis of covariance; balanced incomplete block designs; factorial designs; fixed, random and mixed effects models.
Prerequisites: Mathematics 2050 and either Statistics 3411 or both 1001 and one of Statistics 2501 or 2560 or the former 2511.
Note: Credit can be obtained for only one of Statistics 3520, Psychology 3900 and 3950.

Offered: *Contact the Deputy Head (Statistics) in the Department of Mathematics and Statistics for information regarding the scheduling of this course.*