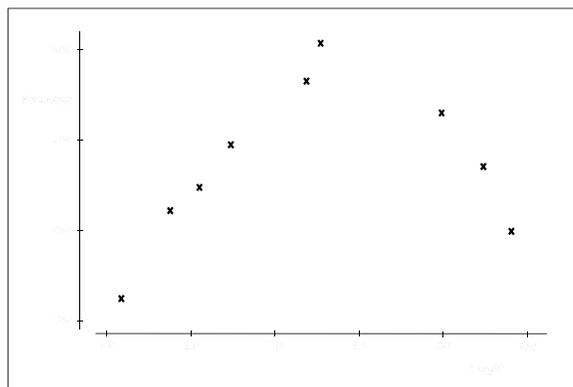


## STATISTICS 3521 REGRESSION

Regression analysis is a branch of statistics that provides techniques on how to model non-exact relationships between two or more variables. For example, medical scientists involved in research on the eye are interested in the thickness of the cornea as it relates to the weight of the eye. The figure to the right shows a point plot of cornea thickness versus eye weight for nine randomly selected growing calves.



*Thickness of cornea versus calf weight*

In regression analysis we would study how to fit a curve to the plotted data in order to better explain the relationship between eye weight and eye thickness. The phrase *regression analysis* was first used in 1885 by Sir Francis Galton, to describe the relationship between father's height  $X$  and son's height  $Y$ . One of the methods used to model such relationships in regression can be traced back to Carl Friedrich Gauss (1777-1855), sometimes called the *Prince of Mathematics*, and is called the method of least squares. Regression analysis, its study and use, continues to expand and today it is perhaps the most widely used of all data analysis methods.

**Text.** There are many good text books on regression analysis. One book which has been used as a text for this course is *Applied Regression Including Computing and Graphics* by R.D. Cook and S. Weisberg.

**Marks.** Set after some discussion with the students but usually follows the pattern, 60% for the final examination with the remaining 40% split among assignments, project, and term test.

**Calendar description. 3521 Regression** covers inferences in simple linear regression analysis including estimation, confidence and prediction intervals, hypotheses testing and simultaneous inference; matrix approach to regression analysis, multiple linear regression, multicollinearity, model building and selection, polynomial regression, qualitative predictor variables.

Prerequisites: Mathematics 2050 and either Statistics 3411 or both Mathematics 1001 and one of Statistics 2501 or 2560 or the former 2511.

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