Preface and Chapter 1 Class Notes

- **You'll need to know infinite/finite series, differential, integral and MVR calculus (double integrals and partial derivatives) in this *"prove it" class* and in STAT405.**
- **It's also wise to gain intuition from applets and simulations in Minitab and/or R.**
- **One major "punch line" of this 404-5 sequence is to demonstrate that the statistical techniques used in a basic methods class (t-, F-, χ^2-tests, etc.) are "best"**
- **Since in hypothesis testing we generate p-values and in regression we use modelling, we spend 404 learning about probability, the "language of statistics"**

As you may know, statisticians serve as problem solvers, and work at the symbiosis between data and theory – called the scientific method (SM)	

- **Mood, Graybill & Boes: statistics is "the technology of the scientific method". Our authors (WMS) point out that statistics is "concerned with the design of experiments or sample surveys to obtain a specified quantity of information at minimum cost and the optimum use of this information in making an inference about a population."**
- **WMS pp.4-5 gives an example of Y = profit, and our desire to determine the effect of independent variables; the empirical relative frequency (p.4) looks like it could come from the normal distribution (p.5)**
- **Area under a histogram is related to probability**
- **Central tendency is usually characterized by the (sample) mean ($\bar{y}$; see p.9); and dispersion is often characterized by the (sample) variance (s^2; p10) or the (sample) standard deviation SD ($s = \sqrt{s^2}$)**
- **The corresponding *population* counterparts are the population mean μ, the population variance σ^2 and the population SD σ**
- **The empirical rule states that for approximately normal distributions, about 68%, 95% and all of the measurements are within 1, 2 and 3 SDs (σ) of μ**
- **p.12, ex. 1.17 points out that $\sigma \approx$ range/4**
- **In-class exercise: using the results in ex. 1.11, do ex. 1.22 on p.16. If time, also do ex. 1.32 on p.18.**