# 3703-3J04 Probability & Statistics for (Civil) Engineering

## C01 - Lecture 1

This course: - importance of randomness in the world & how to handle it

Experiments: anything that produces data (has to come from somewhere!)

- vibration sensing to detect earthquakes
- population control / monitoring
- queues in Campus bookstore

We can model many situations with

- mechanistic model e.g. Ohm's Law to model current in a wire
- empirical model i.e. a "guess" about the relationship between factors based on observed data

BUT however good the model, there will always be residual variation (noise) e.g. - human error

- change in environmental conditions
- electric noise from machinery

STATISTICS : the science of collecting, describing, analysing (numerical) data & inferring (learning) information about the whole from some representative sample

PROBABILITY (THEORY) : the mathematics of random phenomena.