

What Is **Statistics**?

The word **statistics** entered the English language in the 1790s as a term to describe the measurement of characteristics of nations or states (hence the term **statistics**).

What Is **Statistics?**

Quite simply, statistics is the science of data.

OK, So What Are Data?

Data are facts that convey information. Here are some examples:

- Yearly average global surface air temperatures.
- Lifetimes of electrical transformers.
- Breaking strengths of metal pins.
- Percentage of lymphoma patients treated at various medical centers who survive more than 5 years from diagnosis.

What Is this Course About?

In this course, we will focus on **statistical inference**, which is the use of a subset of a population to draw conclusions about the entire population.

The subset is called a **sample**. To enable us to do statistical inference in a scientific way, we will need to select the sample in a statistically valid way. This will mean choosing it according to a known chance mechanism (think of tossing a coin).

What Is this Course About?

You might think the results would be random: and they are!

However, they are not completely random. There is just enough regularity to the resulting randomness to enable us to draw useful scientific conclusions.

What Is this Course About?

The course will be based on four main themes:

- **Producing Data:** How to obtain data in a statistically valid way; types of studies done with the resulting data.
- **Summarizing Data:** Appropriate graphical and numerical summaries of data.
- **Estimation:** Using data to estimate population quantities of interest.
- **Hypothesis Tests:** Using data to test hypotheses about population quantities of interest.