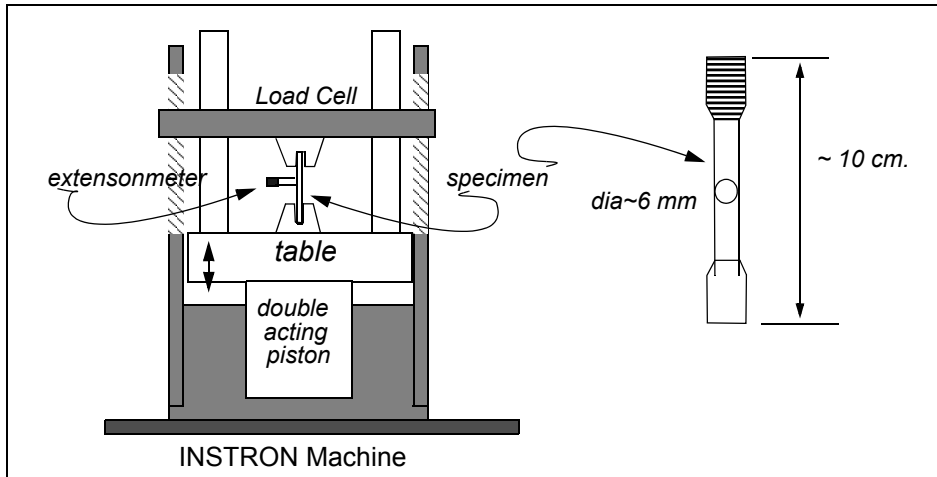


## Spreadsheet Example 1.101 Fall 2006

In a structures lab scheduled for the third week in October, we will subject a specimen in the form of a steel rod to tension using an *Instron* testing machine designed specifically for that purpose. The figure below shows the Instron machine and the approximate shape of the steel specimen.



Our objective will be to observe how the specimen extends as the tensile load is gradually increased - until, ultimately, the steel breaks. An "extensometer" will be used to obtain a measure of extension and a "load cell" used to obtain a measure of the applied tensile force. **The output of both of these transducers will be a voltage.**

Today, at this session, we will take a sample of data taken last fall and convert these values in our spreadsheet to values of *strain and stress*. We will use the spreadsheet first to plot the raw data - load voltage versus extension voltage - then to plot stress versus strain. Our purpose is not to explain how a tension test is conducted nor even to discuss the results of that test in any great detail. You will have the opportunity to learn all about these matters the third week of October. Rather our aim is to give you the opportunity to work with the spreadsheet processing and plotting of test data. But note that what we do today as a spreadsheet exercise will serve as a template for data reduction, analysis and plotting when you do conduct the test in October.

Most of you, I imagine, are familiar with and have used Microsoft's spreadsheet. We will use "Xess", which is available on Athena. Most all of the important points I want to make today carry over directly to Microsoft Works.

To launch Xess:

```
athena% add xess
```

```
athena% xess &
```

We import our 05 data file:

```
Xess menu: File>Import
```

```
Filter Window: File Format>Tab Separated Values
```

```
Files > tensile.tsv [Note: This is available at Stellar 1.101>Materials>General]
```

**OK**

We carry on via overhead display.