**Required Reading**

The Full Factorial design is a design in which every setting of every factor appears with every setting of every other factor. This necessitates determining which factors to include and which to exclude from the study. Selecting the factors is an important step. This section of the Engineering Statistics Handbook discusses this key step.

NIST (2006).Engineering Statistics Handbook retrieved on Sept. 9, 2009, from <http://www.itl.nist.gov/div898/handbook/pri/section3/pri32.htm>

Consider the turning operation that was introduced in Module 4. There were five factors to be considered. As it turns out, you have determined initially that three of these factors should be studied in the experiment: spindle speed, feed rate, and tool nose radius. How should these factors be utilized in this experiment? This section of the Engineering Statistics Handbook discusses the Full Factorial design. The two-level design is used when you think that the relationship between input factors and response is linear.

NIST (2006).Engineering Statistics Handbook retrieved on Sept. 9, 2009, from  <http://www.itl.nist.gov/div898/handbook/pri/section3/pri333.htm>

Given that there are three factors that we have identified, how do we design the two-level, three-factor Full Factorial experiment? Read this section of the Engineering Statistics Handbook which discusses this specific design.

NIST (2006).Engineering Statistics Handbook retrieved on Sept. 9, 2009, from <http://www.itl.nist.gov/div898/handbook/pri/section3/pri3331.htm>

Then the next section (you can just click on Next on the page of the Engineering Statistics Handbook) provides an example of the 23 DOE. It is very similar to the Shaft Turning situation we have been discussing since Module 4. Note that this example uses two replications.

NIST (2006).Engineering Statistics Handbook retrieved on Sept. 9, 2009, from <http://www.itl.nist.gov/div898/handbook/pri/section3/pri3332.htm>