# CHEN3600 – Computer-Aided Chemical Engineering Spring 2012

# Chemical Engineering Department HW 4

**T.D. Placek Auburn University**

 **HW 4 – Graphing the Moody Friction Factor Chart**

In this assignment, you will be preparing a Moody Friction Factor Chart. The target graphic can be found at this link:

[http://en.wikipedia.org/wiki/File:Moody\_diagram.jpg](http://en.wikipedia.org/wiki/File%3AMoody_diagram.jpg)

Your solution will be graded considering the effort made to include as many elements of the above plot as possible. Note: It is not necessary to duplicate all graph elements (but it would receive a higher grade).

Ordinarily, the Moody plot is not shown in Chemical Engineering textbooks (where the Fanning Friction Factor is employed) but frequently appears in Mechanical and Civil Engineering Fluids texts.

In observance of the fact that there are more Mechanic and Civil Engineering than Chemical Engineers, we will develop the Moody chart.

The Moody chart was developed by fitting various equations to experimental data collected on artificially roughened pipe. There is no “theory” so the fashion in which the data was correlated has many approaches. One of the most common representations is known as the Colebrook–White equation (<http://en.wikipedia.org/wiki/Darcy_friction_factor_formulae>). Unfortunately, this equation is not explicit in “f” and would need to be solved iteratively or by other implicit methods. We’ll do this later in the term.

The most accurate explicit (for “f”) correlation is Goudar–Sonnad equation (see previous link). This is the method to be employed in this assignment.

Because of the sequential nature which will be employed to develop your final plot, employ cell mode to develop your published final submission. Your script should be named email\_hw4.m and the function used to calculate the required friction factor should be named email\_f\_factor.m Your external function(s) should be added to the end of the script in a cell named Referenced Functions. These will be commented out, of course.

*Important note: The above treatment of an assignment as a script with external functions included as comments in a Referenced Functions cell will be used on all exams and the final. It is in your best interest to become proficient at this script format.*