LECTURE ACTIVITIES

Activity 1 (2017-08-14): Problem Solving – synthesize a well-formed solution to the following questions:

- a. (Try to do this one in your own way without looking back at your notes) A flagpole extending from point F on the ground to point P in the air is 20 meters tall. From point A on the flat ground, the angle of elevation to the top of the flagpole is 40°. If point B is halfway from A to F, what is the measure of the angle of elevation from point B to the top of the flagpole? (ans = 59.21 degrees)
- b. An electric power plant burns coal at a rate of 1500kg/hr. The coal has a sulfur content of 2%. Before putting an emission control system on the exhaust of the plant, all of this sulfur ended up being emitted into the environment. After modifying the plant and installing a cleanup system, 80% of the sulfur is captured before leaving the exhaust stacks of the plan. How many kg of sulfur are emitted each day after the modification? (ans = 144 Kg/day)
- c. The magnitude M of an earthquake on the Richter scale is given by:

$$M = \frac{2}{3} \log \left(\frac{E}{E_0}\right)$$

where E is the energy released by the earthquake, and E0 = 104.4 Joules is a constant (energy of a small reference earthquake). Determine how many time more energy is released from an earthquake that registers 7.2 on the Richter scale than one that registers 5.3. (ans = 707.95 times bigger)

Activity 2 (2017-08-14): Basic computing - Solve the following using only matlab:

a.
$$\frac{35.7 * 7^3}{45 - 5^2}$$
 (ans = 612.25)
b. $(2 + 7)^3 + \frac{273^{2/3}}{2} + 55^2$ (ans=3775.04)
 $3^7 \log(76)$

C.
$$\frac{3^{7} \log(76)}{7^{3} + 546} + 3^{2}$$
 (ans=13.626)

d.
$$43 * \frac{\sqrt{56}}{\ln(14)} + e^4$$
 (ans=176.529)

Activity 3 (2017-08-14): Computing with assignment statements - Define the variables w = 15, x = -5, y = 64 and z = 0.5(wx-y) and calculate (HINT: Watch podcast 1 – Computing in Matlab)

a.
$$w + x + y - z$$
 (ans = 143.5)

b.
$$w + \frac{wx}{y} \frac{(w+z)^2}{\sqrt{|wx|}}$$
 (ans=-386.92)

Activity 4 (2017-08-16): Scripting – write a computer program in Matlab that solves the problem posed in Activity 1c, creating the program to be as general as possible (HINT: Watch podcast 2: Writing Scripts in Matlab)