ENGINEERING PHYSICS 4D3 Assignment #6 Set:
Due:

1. [Duderstadt & Hamilton 7-3]
   What percentage of the neutrons slowing down in hydrogen will tend to skip groups if the group structure is chosen such that $E_{g-1} / E_g = 100$?

2. [Duderstadt & Hamilton 7-4]
   Write out the detailed form of the steady state multigroup diffusion equations, $\underline{\underline{M}}\,\underline{\varphi} = k^{-1}\underline{\underline{F}}\,\underline{\varphi}$, for a four group model in which simultaneously: (a) there is direct coupling, (b) the fission source exists only in the upper two groups, and (c) no upscatter.

3. Consider a 1 dimensional slab reactor bounded by a moderator on either side. Using the 2 group neutron approximation, model the neutron flux numerically. The fuel region is composed of 8 fuel cells that are 3.81 cm. thick each. The left and right moderator regions are each composed of 6 moderator cells. Each cell is 3.81 cm. thick. Solve for the steady state only. Use the following properties:

MODERATOR		**FUEL**	
Group 1 (Fast)	Group 2 (Thermal)	Group 1 (Fast)	Group 2 (Thermal)
$\Sigma_a = 0.000137$	$\Sigma_a = 0.012534$	$\Sigma_a = 0.0003928$	$\Sigma_a = 0.054359$
$\Sigma_r = 0.042404$	$\Sigma_r = 0.012534$	$\Sigma_r = 0.026435$	$\Sigma_r = 0.054359$
$D = 1.098166$	$D = 0.223172$	$D = 1.366878$	$D = 0.339414$
$\Sigma_{s11} = 0.236529$	$\Sigma_{s21} = 0.0$	$\Sigma_{s11} = 0.217325$	$\Sigma_{s21} = 0.0$
$\Sigma_{s12} = 0.042267$	$\Sigma_{s22} = 1.153172$	$\Sigma_{s12} = 0.026043$	$\Sigma_{s22} = 0.739785$
$\nu\Sigma_f = 0.0$	$\nu\Sigma_f = 0.0$	$\nu\Sigma_f = 0.000450$	$\nu\Sigma_f = 0.090883$
		$\chi_1 = 1.0$	$\chi_0 = 0.0$