

**EME 521 – MATHEMATICAL MODELING**  
COUPLED PROCESSES OF DEFORMATION, FLOW AND TRANSPORT

**SELF-STUDY OUTLINE**

Wk.	Activity		EGEE_FEM Deliverable	Element	Data
	Tuesday	Thursday			
1		0. Organizational Meeting			
2	1. Introduction	2.a. Flow – 1D			
3	2.b. Flow – 1D – Galerkin	2.c. Flow – 2D	1D – Flow – Steady	elmt11.m	input_11_1/11_2/11_3.m
4	2.d. Flow – 1D – Isoparametric	2.e. Flow – 2D – Isoparametric	2D – Flow – Steady	elmt21.m	input_21-1/21_2.m
5	2.f. Flow – 1D – Transient - Implicit	2.g. Flow – 1D – Transient - Explicit	2D – Flow – Implicit	elmt21.m	input_21-1/21_2.m
6	3.a. Advection – 1D	3.b. Advection – 2D	2D – Flow – Explicit	elmt21.m	input_21-1/21_2.m
7	3.c. Advection – 1D – Reaction	4.a. Stokes Flow – 2D	2D – Advection – Steady	elmt22.m	input_22_1.m
8	5.a. Solid Mechs – 1D	5.b. Solid Mechs – 2D	2D – Stokes Flow – Steady	elmt23.m	input_23_1.m
9	6.a. Dual Porosity	6.b. HM Theory	2D – Solid Mechs	elmt24.m	input_24_1/24_2.m
10	6.c. HM Comsol	6.d. HM – 1D	2D – HM - Steady	elmt25.m	input_25_1/25_2.m
11	7.a. Lagrangian-Eulerian	7.b. Level Set Methods	2D – HM - Transient	elmt25.m	input_25_1/25_2.m
12	7.c. Boundary Element Methods				
13	Presentations (TBD)				
14	Presentations (TBD)				
15	Presentations (TBD)				

**EGEE\_FEM KEY**

	1-Dimensional	2-Dimensional
Flow/Diffusion/Conductivity	elmt11	elmt21
Advection Diffusion	elmt12	elmt22
Navier-Stokes Flow	-	elmt23
Solid Mechanics	elmt14	elmt24
HM Coupling	-	elmt25