Computational Reservoir Geomechanics
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http://www.ems.psu.edu/~elsworth/courses/comp_res_geomechs/2018/
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Day 1 (Thursday May 31st)

1. Reactive Flow and Permeability Dynamics – I [09:00-10:15]
2. Reactive Flow and Permeability Dynamics – II [10:30-11:45]
   ------ Lunch ----- [11:45-14:30]
3. Introduction to Computational Reservoir Geomechanics [1:1] [Self-Study]
4. Fluid Flow and Pressure Diffusion [2:-]
   a. Finite Element Methods [2:1] [14:30-15:45]
   b. Conservation Equations and Galerkin Approximation [2:2] [16:00-17:15]

Day 2 (Friday June 1st)

----- Free-morning ----- [09:00-11:45]

1. Fluid Flow and Pressure Diffusion, Continued [2:-]
   a. 2D Triangular Constant Gradient Elements [2:3] [14:30-15:45]
   b. 1D Isoparametric Elements [2:4] [16:00-17:15]

Day 3 (Saturday June 2nd)

1. Geomechanics of Coal and Gas Shales [09:00-10:15]
2. Fluid Flow and Pressure Diffusion, Continued [2:-]
   a. 2D Isoparametric Elements and Numerical Integration [2:5] [10:30-11:45]
   ------ Lunch ----- [11:45-14:30]
   b. Transient Behavior – "Mass" Matrices [2:6] [14:30-15:45]
   c. Transient Behavior – Integration in Time [2:7] [16:00-17:15]

Day 4 (Sunday June 3rd)

1. Gas Fracturing in Unconventional Reservoirs [09:00-10:15]
2. Mass Transport [3:-]
   a. Conservation of Mass and 1D Models [3:1] [10:30-11:45]
   ------ Lunch ----- [11:45-14:30]
   b. 2D Constant Gradient Elements [3:2] [14:30-15:45]
   c. Sorption and Reactive Transport [3:3] [16:00-17:15]
3. Momentum Transport [4:-]
   a. Self Study – Fluids, Navier-Stokes Equations [4:1] [Self-Study]

Day 5 (Monday June 4th)

1. Solid Mechanics [5:-]
   a. Propagation, Proppant Transport and Conductivity of HFs [09:00-10:15]
   b. 1D and 2D Elements [5:1] [10:30-11:45]
   c. Self Study – Constitutive Equations [5:2] [Self-Study]
   d. Self Study – Preamble for Coupled Systems [5:3] [Self-Study]
   ------ Lunch ----- [11:45-14:30]
2. "Coupled" Multiphysics Systems [6:-]
   a. Dual-Porosity/Dual-Permeability Models [6:1] [14:30-15:45]
   b. Coupled Hydro-Mechanical Models [6:2] [16:00-17:15]
   c. Self-Study – ComSol Models for HM Coupling [6:3] [Self-Study]
   d. Self-Study – EGEEfem Models for HM Coupling [6:4] [Self-Study]