Introduction to Groundwater Modeling Using MODFLOW

San Diego State University

San Diego, CA

January 9-13, 2023

**Monday**

8:00 Introductions  
 8:30 Lecture - Overview of Groundwater Flow and Governing Equations  
 9:45 Break  
 10:00 Lecture - Overview of Finite-Difference Methods  
 11:30 Lunch  
 12:30 Lecture – MODFLOW Background  
 1:00 Lecture – Getting Started with MODFLOW 6  
 1:45 Break  
 2:00 Introduction to Problem 1 – Basic steady-state flow simulation  
 2:15 Workshop – Building the MODFLOW data files for Problem 1  
 4:00 FloPy Demo – Problem 1  
 4:30 Adjourn

**Tuesday**

8:00 Lecture – Simulation Output  
 8:30 Lecture – Introduction to pre- and post-processing tools for the class  
 9:00 Workshop – Problem 1 (continued)  
 10:00 Discussion – Problem 1  
10:30 Lecture – Matrix Solvers  
11:30 Lunch  
 12:30 Lecture – Storage (STO) and Traditional Stress Packages  
 1:30 Break  
 2:00 Introduction to Problem 2 – Stress packages and transient flow  
 2:15 Workshop – Problem 2  
 4:30 Adjourn

**Wednesday**

8:00 Workshop – Problem 2 (continued)  
9:00 Discussion - Problem 2  
 9:30 Lecture/Workshop – ZoneBudget  
 10:00 Break  
10:30 Lecture – Model Calibration  
11:30 Lunch  
 12:30 Introduction to the McDonald Valley Calibration Problem

1:00 Workshop – Planning phase  
2:00 Discussion – Group plans

2:30 Workshop – Calibration with existing data  
4:30 Adjourn

**Thursday**  
 8:00 Lecture - Field Data Collection Options  
 8:15 Workshop – Field Data Collection and Calibration Refinement  
 10:15 Lecture - Model Projection Runs  
 10:30 Workshop – Generate Model Projections  
 11:30 Lunch  
12:30 Workshop – Generate Model Projections (continued)  
 2:00 Discussion – McDonald Valley Problem  
 2:30 Break  
 3:15 Lecture/Workshop – Advanced Topic: Lake Package  
 4:30 Adjourn

**Friday**

8:00 Lecture/Workshop – Advanced Topics: Streamflow Routing Package

9:00 Lecture/Workshop – Advanced Topics: Water Mover Package

9:30 Lecture – Advanced Topics: MAW/UZF Packages

10:00 Break

10:15 Lecture/Workshop – Advanced Topics: Unstructured Grids  
10:45 Lecture/Workshop – Advanced Topics: XT3D  
 11:30 Lunch  
 12:30 Lecture/Workshop – Advanced Topics: Newton Formulation

1:00 Lecture/Workshop – Advanced Topics: Local Grid Refinement  
 1:45 Break  
 2:00 Lecture – MODPATH Particle Tracking Overview  
 3:00 Workshop – MODPATH Problem  
 3:30 Lecture – Groundwater Transport Model  
 4:00 Wrap-up  
 4:30 Adjourn