# EART 110C/N — The Dynamic Earth
## Syllabus for Spring 2015

Instructor:  Doug Hemingway (djheming@ucsc.edu), Office Hours: Mon 1–3pm, A101

TAs:     Grace Barcheck (cbarchec@ucsc.edu), Office Hours: Wed 3–5pm, C332
         Qingjun Meng (qimeng@ucsc.edu), Office Hours: Wed Noon–2pm, C332
         Danica Roth (dlroth@ucsc.edu), Office Hours: Thu 10–11am, 3rd floor knuckle

MSI Tutor:  Steven Dibb (sdibb@ucsc.edu), website: http://www2.ucsc.edu/lss/msi.shtml

Course meetings:
         Lecture:        Engineering 2, Room 194, Tuesdays & Thursdays, Noon–1:45pm
         Labs:           E&MS D258, Tuesdays 5:30pm–8:30pm   –OR–
                         E&MS D258, Wednesdays 6:30pm–9:30pm

Grading for 110C (5 units):
         20%     Problem Sets (8 in total, lowest score dropped)
         20%     Midterm 1 (April 21)
         20%     Midterm 2 (May 14)
         40%     Final Exam (June 8)

Grading for 110N (2 units):
         100%    Individual Lab Reports (9 in total, lowest score dropped)

Grading policy: Labs due at start of next lab period. Problem Sets due in class on dates
         indicated on the schedule. Guaranteed to be graded only if turned in on time.

Prerequisites:  Calculus, Classical Mechanics

Materials:
   • Course Textbook: Turcotte & Schubert, Geodynamics, 3rd edition, 2014
   • Supplementary Textbook: Lowrie, Fundamentals of Geophysics, 2nd edition, 2007
   • Both textbooks are on reserve in the Science and Engineering Library
   • Required Software: Matlab (available in campus PC labs, or buy your own copy for
     $99 at http://www.mathworks.com/academia/student_version)
   • Calculator: needed for exams, problem sets, and labs
   • eCommons: check your grades, get labs, problem sets, lecture notes and links
   • www.socrative.com room: 6e10f764

Purpose and value of this course:
   • Apply your math and physics skills to solve problems in earth & planetary sciences
   • Get experience with four of the major tools of geophysics: gravity, elasticity, fluid
     mechanics, and heat transport
   • Get experience using Matlab as a tool for solving geophysics problems

How to succeed in this course:
   • Don't rush the problem sets! Start early and take your time to make sure you
     understand the material thoroughly. Collaboration is encouraged, but make sure what
     you turn in is your own work (if asked, could you reproduce it on your own?). If you
     really understand the problem sets, you will be in great shape for the exams!
   • Take advantage of TA and Instructor office hours to make sure you are getting a full
     understanding of the material.

Tentative Course Schedule for 110C/N, Spring 2015:

| | Tuesday Class | Tue/Wed Lab | Thursday Class |
|---|---|---|---|
| Week 1 | 31-Mar<br><br>Interior Structure | 31-Mar          1-Apr<br><br>Mystery Planets | 2-Apr<br><br>Moments of Inertia |
| Week 2 | 7-Apr<br><br>Gravity | 7-Apr          8-Apr<br><br>Gravity / Isostasy<br><br>Lab 1 due | 9-Apr<br><br>Isostasy<br><br>PS1 due |
| Week 3 | 14-Apr<br><br>Elasticity | 14-Apr          15-Apr<br><br>Elasticity<br><br>Lab 2 due | 16-Apr<br><br>Flexure<br><br>PS2 due |
| Week 4 | 21-Apr<br><br>Midterm 1 | 21-Apr          22-Apr<br><br>Matlab<br><br>Lab 3 due | 23-Apr<br><br>Faults/Friction<br><br>PS3 due |
| Week 5 | 28-Apr<br><br>Earthquakes | 28-Apr          29-Apr<br><br>Earthquakes<br><br>Lab 4 due | 30-Apr<br><br>Waves<br><br>PS4 due |
| Week 6 | 5-May<br><br>Seismology | 5-May          6-May<br><br>Waves<br><br>Lab 5 due | 7-May<br><br>Viscosity<br><br>PS5 due |
| Week 7 | 12-May<br><br>Navier-Stokes | 12-May          13-May<br><br>Viscosity<br><br>Lab 6 due | 14-May<br><br>Midterm 2 |
| Week 8 | 19-May<br><br>Viscoelasticity | 19-May          20-May<br><br>Bubbles<br><br>Lab 7 due | 21-May<br><br>Heat Transfer<br><br>PS6 due |
| Week 9 | 26-May<br><br>Diffusion | 26-May          27-May<br><br>Diffusion<br><br>Lab 8 due | 28-May<br><br>Convection<br><br>PS7 due |
| Week 10 | 2-Jun<br><br>Geodynamo | 2-Jun          3-Jun<br><br>Review<br><br>Lab 9 due | 4-Jun<br><br>Review<br><br>PS8 due |

Final Exam: Monday, June 8, 7:30–10:30pm