Course Syllabus

Jump to Today

Objectives:

- Introduce basic aspects of finite element technology, including domain discretization, polynomial interpolation, boundary conditions, assembly of global arrays, and solution of the resulting algebraic systems.
- Learn how to develop finite element codes from scratch. Our focus in this course is the inner workings of FEM.

Main References:

- Zohdi T, "A Finite Element Primer for Beginners (https://link.springer.com/book/10.1007/978-3-319-70428-9)," Springer, 2015. (free online)
- Hughes TJR, "The Finite Element Method: Linear Static and Dynamic Finite Element Analysis (https://books.google.com/books/about/The_Finite_Element_Method.html?id=cHH2n_qBK0IC&printsec=frontcover&source=kp_read_button#v=onepage&q&f=false)", Dover, 2000. (first two chapters available online, otherwise full text cost <~$20)

Instructor:

Shawn Shadden
Email: shadden@berkeley.edu (mailto:shadden@berkeley.edu) (please see email policies below)
Office hours: Mondays 2:30PM-4PM
Location: 6153 Etcheverry (Vogt Conference Room)--if not there, please try 6149 Etcheverry (regular office) or 6185 (Vice-Chair office)

GSI:

Tongge Wu
Email: wutongge@berkeley.edu (mailto:wutongge@berkeley.edu) (please see email policies below)
Discussion hours: Wednesdays 12-1PM and Thursdays 5-6PM, 10 Jacobs Hall
Office hours: Wednesdays 3-5PM, 1171 Etcheverry

Reader:

Zachariah Rodriquez
Email: (mailto:%20yildizdag@berkeley.edu) zrodr22@berkeley.edu (mailto:zrodr22@berkeley.edu)
(please see email policies below)
Office hours: By appointment

Email Policies:

- Non-trivial matters (e.g., questions on assignments, special requests, etc.) are best discussed in person
- Please send email from your berkeley.edu account
- For questions related to grading, please consult Reader first

- Attempt will be made to respond to emails in a timely manner. Please allow 24 hours for response. If no response is received within 24 hours, send a friendly reminder.

Assessment:

Course grade will be comprised of the following components: **50% Assignments, 20% Midterm Exam, 30% Final Exam**

Late Assignment Policy:

Without prior approval from Instructor, the following deductions (based on total possible points) will apply for late assignments: 0-6 hours late, no deduction; 6-24 hours late, 15% deduction; 24-48 hours late, 25% deduction; 48-96 hours late 35% deduction. Assignments submitted over 4 days late will not be accepted.

A few notes on getting help:

- You are highly encouraged to collaborate with fellow classmates**.** This is one of the best ways to learn and establish community. However, ***collaboration should be geared to conceptual understanding*****;** assignment solutions should be an expression of your resulting understanding and developed independently.
- Discussion sessions and faculty/GSI office hours are prime opportunities to seek help.
- Piazza can be effective for basic questions. I strongly encourage students to answer student questions (even if you are not 100% sure of your answer). Piazza will be monitored by GSI and responses will be supplemented as needed and possible.

Outline of Main Topics:

- FEM in 1D
- Higher order elements, adaptive refinement and Gauss quadrature
- FEM in 2D and 3D
- Incorporating constraints
- FEM for a vector PDE, elastostatics
- Incompressibility / Mixed formulation
- FEM for time-dependent problems
- Linear solvers (time-permitting)
- FEM for nonlinear problems

Academic Integrity

As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others. Please read information at: **http://asuc.org/honorcode/resources/HC%20Guide%20for%20Syllabi.pdf (http://asuc.org/honorcode/resources/HC%20Guide%20for%20Syllabi.pdf)**

Collaboration

Collaboration on assignments is permitted, but ***you must produce your own unique solutions***.

Accommodation for Students with Disabilities

Please see me as soon as possible if you need particular accommodations, and we will work out the necessary arrangements.

Teaching students with Disabilities (http://dsp.berkeley.edu/TeachStudentsWithDisab.html)

Scheduling Conflicts

Please notify me in writing by the second week of the term about any known or potential extracurricular conflicts (such as religious observances, graduate or medical school interviews, or team activities). I will try my best to help you with making accommodations, but cannot promise them in all cases.

Course Summary:

Date	Details	
Mon Sep 9, 2019	**Read Sec. 1.1 to 1.9 in Hughes (https://bcourses.berkeley.edu/courses/1485117/assignments/8018882)**	due by 11:59pm
Sun Sep 22, 2019	**Assignment 1 (https://bcourses.berkeley.edu/courses/1485117/assignments/8022642)**	due by 11:59pm
Sun Oct 6, 2019	**Assignment 2 (https://bcourses.berkeley.edu/courses/1485117/assignments/8026683)**	due by 11:59pm
Tue Oct 15, 2019	**Midterm (https://bcourses.berkeley.edu/calendar?event_id=2236146&include_contexts=course_1485117)**	11am to 12:30pm