

DEPARTMENT OF CHEMICAL ENGINEERING
University of California, Santa Barbara

ChE 132B

Fall 2013

Computational Methods in Chemical Engineering
http://www.chemengr.ucsb.edu/people/faculty_d.php?id=29

Professor O.C. Sandall

Office: 3336 Engineering II Building

Phone: 893-2908

Email: sandall@engineering.ucsb.edu

Office hours: 1:00 - 2:00 p.m., Tuesday and Thursday

T.A. – Michael Zakrewsky

Office: ESB 2003 (Engineering Sciences Building, Room 2003)

Email: zakrem@engineering.ucsb.edu

Office hours: 5:00 – 7:00 p.m., Monday & Wednesday

Textbook: “A Friendly Introduction to Numerical Analysis” – Brian Bradie

Topics Covered:

1. Dimensional analysis and scaling in setting up model differential equations.
2. Application of Taylor Series and estimates of errors involved in the use of Taylor Series.
3. Implementation of interpolation methods and estimate of errors.
4. Method of Least Squares for linear and non-linear cases.
5. Various methods for solution of non-linear algebraic equations.
6. Numerical evaluation of integrals using the Trapezoidal Rule with extrapolation.
7. ODE – Initial Value problems using numerical methods (Euler, Runge-Kutta, Improved Euler with extrapolation) and estimation of errors.
8. ODE – Boundary Value problems using the shooting method and the finite difference method.
9. PDE problems using the finite difference method and the Method of Lines.

Grading:

Homework **20%**

Midterm **20%**

Final **60%**