CHM 516 – Numerical Methods in Chemical Engineering  
Fall Semester 2015

Classroom and Schedule: Engineering Complex III room 234,  
Tuesday, Thursday 11:45 a.m. — 1:00 p.m.  
No class on Nov. 10 and 12 (AICHE annual meeting), Nov. 24 and 26 (Thanksgiving Holiday).

Catalog Description:
CHM 516. Numerical Methods in Chemical Engineering 3 cr.  
Survey of numerical methods for solving problems commonly encountered in heat and mass transfer, fluid mechanics, and chemical reaction engineering.

Required Textbook:

Audience:
This class is intended for chemical engineering graduate students. It is one of the core courses.  
*Chemical Engineering graduate students must make B or better.*

Instructor: Dr. Tom Manz  
Office: Regents Row room A100  
Email: tmanz@nmsu.edu  
Phone: 575-646-2503

Office hours: Monday, Wednesday, Friday 11:00 a.m. — 12:00 p.m.  
except Sept. 7 (Labor day), Nov. 9, 11, and 13 (AICHE annual meeting), Nov. 23, 25, and 27 (Thanksgiving Holiday).

Final Exam: 2 hours, comprehensive, Tuesday December 8, 10:30 a.m. — 12:30 p.m,  
Engineering Complex III room 234.

Course Objectives:
A working knowledge of numerical methods and basic programming skills is critical for solving many classes of problems that occur in both academic and industrial settings. This class will provide the students with basic computational skills for solving many classes of engineering problems. It will also help the students gain a working knowledge of Matlab programming.

At the end of this course you will be able to:
- Solve linear and nonlinear systems of matrix equations  
- Numerically solve ordinary and partial differential equations  
- Numerically optimize functions to find zeros, minima, and maxima  
- Solve basic problems in statistics and use Bayesian statistics for parameter estimation  
- Perform Fourier analysis
Topics Covered: (These follow the chapters in Beers.)
1. Matlab programming
2. Linear Algebra
3. Nonlinear algebraic systems
4. Matrix eigenvalue analysis
5. Initial value problems
6. Numerical optimization
7. Boundary value problems
8. Probability theory and stochastic simulation
9. Bayesian statistics and parameter estimation
10. Fourier analysis

Grading:
Late homework may be submitted for grading before the solution is posted, but will be assigned 60% credit. Homework cannot be turned in late after the solution is posted or given in class. Homework can be turned in early if a student expects to be absent.

The total point accumulation and final grade distribution for this course will be as follows:
- Attendance: 5%,
- Chapter Highlights: 10%,
- Quizzes: 15%,
- Homework Assignments: 20%,
- Journal Article Critiques: 10%,
- Midterm: 20%,
- Final: 20% (comprehensive)

90-100% A; 80-89% B; 70-79% C; 60-69% D; below 60% F

Online resource: Course related content will be posted on canvas, which is accessed via nmsu.instructure.com.

Withdrawals: Students will not receive an automatic drop for persistent absences or persistent failure to complete assignments. The responsibility for withdrawals is completely up to the student.

Working together on assignments: Teamwork on homework is encouraged for learning purposes. However, all assignments turned in by the student must show the student's own work. All examination answers must be strictly one's own work. Copying homework or allowing others to copy your homework is strictly forbidden and both parties will receive a zero for the assignment. See the Common Syllabus Addendum for more details.

Incomplete Grades: A grade of Incomplete (I) is given only if the student is passing and cannot complete the required work for reasons beyond the student's control that develop after the last day to withdraw from the course.

Extra Credit: There may be opportunities over the course of the semester to earn extra credit points. These opportunities will be announced in class. The extra credit will be considered when assigning final grades.

Common Syllabus Addendum: This syllabus also contains the Department of Chemical & Materials Engineering, Common Syllabus Addendum, Fall 2015, that describes CHME Announcements, Attendance Policy, Student Accessibility Services (disability accommodations), Misconduct, Cell Phone Use, Re-grades, Student Work Products, Communication, Video Surveillance, Computer Resources, Etiquette, and Firearms. This Common Syllabus Addendum can be found at http://chme.nmsu.edu/academics/syllabi/chme-common-syllabus-addendum/