

Course Schedule
Chemical Engineering 231
Mathematical Modeling
Spring 2019

| Date | Lecture Topic | Reading | Due |
|-------------|---|-------------------------|------------|
| 1/22 | Introduction | Lecture notes | |
| 1/23 | MATLAB: Introduction | Lecture notes | |
| 1/24 | Probability | Sections 24.1–24.3 | |
| 1/29 | Probability distributions | Sections 24.5, 24.6 | Written #1 |
| 1/30 | MATLAB: Manipulating data | Lecture notes | |
| 1/31 | Binomial & normal distributions | Sections 24.7, 24.8 | |
| 2/5 | Confidence intervals | Sections 25.1–25.3 | Written #2 |
| 2/6 | MATLAB: Functions | Lecture notes | |
| 2/7 | Hypothesis testing | Section 25.4 | |
| 2/12 | Correlation & regression analysis | Section 25.7 | Written #3 |
| 2/13 | MATLAB: Statistics toolbox | Lecture notes | |
| 2/14 | Experimental design | Lecture notes | |
| 2/19 | MONDAY SCHEDULE | | |
| 2/20 | MATLAB: Statistics | Lecture notes | |
| 2/21 | Linear algebra | Sections 7.1, 7.2 | MATLAB #1 |
| 2/26 | MIDTERM EXAM #1 | | |
| 2/27 | MATLAB: Program control | Lecture notes | |
| 2/28 | Gauss elimination | Sections 7.3, 7.4, 20.1 | |
| 3/5 | Matrix inverse | Sections 7.5, 7.6, 7.8 | Written #4 |
| 3/6 | NO CLASS | | |
| 3/7 | NO CLASS | | |
| 3/12–3/14 | SPRING BREAK | | |
| 3/19 | Ill-conditioned matrices | Section 20.4 | |
| 3/20 | MATLAB: Matrix calculations | Lecture notes | |
| 3/21 | Least-squares problems | Section 20.5 | |
| 3/26 | Eigenvalues & eigenvectors | Sections 8.1, 8.4 | Written #5 |
| 3/27 | MATLAB: Linear algebraic systems | Lecture notes | |
| 3/28 | Nonlinear algebraic equations | Section 19.2 | |
| 4/2 | Newtown-Raphson method | Lecture notes | Written #6 |
| 4/3 | MATLAB: Nonlinear algebraic equations | Lecture notes | |
| 4/4 | Formulating ODE models | Sections 1.1, 1.2 | |
| 4/9 | Linear ODE systems | Sections 4.1–4.3 | MATLAB #2 |
| 4/10 | ODE system stability | Sections 4.4, 4.5 | |
| 4/11 | MIDTERM EXAM #2 | | |
| 4/16 | Numerical differentiation | Sections 21.1, 2.2 | Written #7 |
| 4/17 | MONDAY SCHEDULE | | |
| 4/18 | Numerical solution of ODEs | Sections 21.1, 2.2 | |
| 4/23 | Numerical solution of ODE systems | Section 21.3 | |
| 4/24 | MATLAB: Nonlinear ODEs | Lecture notes | MATLAB #3 |
| 4/25 | Boundary value ODEs | Lecture notes | |
| 4/26 | Differential-algebraic equation systems | Lecture notes | |
| 5/1 | MATLAB: Linear ODEs | Lecture notes | Project |