**LEHIGH UNIVERSITY**

**Department of Mechanical Engineering and Mechanics**

**ME413 NUMERICAL METHODS in ENGINEERING Fall 2010**

**Lecture Schedule**

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| **Date** | **No** | **Weekly Topics** | **Weekly Reading** | **Assignments** |  **Due**  |
| Aug 30Sep 1 | 12 | Review of Taylor SeriesRational ApproximationsChebyshev Economization | Notes + Chapter 1 | **HW1:**   **S1.2**: Problems 15b, 25, 39, 45, 52 ;  **S2.2** : Problems 9, 17, 27; **S3.1** : Problem 1, 2, 9; **S3.2 :** Problem 4, 10, 14;**PA1 :** **S2.2** : Computer Problem 18 |  **9/15/10** |
| Sep 6Sep 8  | 34 | Loss of SignificanceSolution of Nonlinear Equations | Notes + 2.1, 2.2 & Chapter 3 |
| Sep 13Sep 15 | 56 | Review of Linear Algebra & Systems of Linear Equations – Computer Implementation | Notes + Chapter 7 | **HW2: S7.1**: Problem 3b, 4, 7a, 7b, 7c;  **S7.2** : Problems 3, 6, 10, 17; **PA2 :** **S7.2** : Computer Problems 2 and 3 using Gauss and Solve (check with MATLAB) **S7.3** : Computer Problem 4  (check with MATLAB)  | **9/29/10** |
| Sep 20Sep 22 | 78 | Iterative Improvement  Compact Schemes | Notes + 8.1, 8.2  |
| Sep 27Sep 29 | 910 | Gauss Seidel methodCurve FittingCubic Splines | Notes + Chapter 4Notes + 9.1, 9.2 | **HW3: S4.1 :** Problems 6, 12, 18; **CP4.1** :Problem 12; **S4.3 :** Problems 1, 10, 16; **S9.2 :** Problems 1, 4, 14; **PA3:** Prob. 6 of Computer Probls Section 9.2   | **10/13/10** |
| Oct 4Oct 6 | 1112 | Curve Fitting - Least Squares**REVIEW FOR TEST** | Notes + 12.1  |
| Oct 11Oct 13 |   | **PACING BREAK****FIRST TEST** |  |   |  |
| **TEXT: Numerical Mathematics & Computing (6th edition) by Cheney & Kincaid- Thomson Brooks/Cole**  |

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| **Date** | **No** | **Weekly Topics** | **Weekly Reading** | **Assignments** | **Due Date** |
| Oct 18Oct 20  | 1314 | Numerical IntegrationNumerical Integration | Chapter 5 |  To be announced ( See assignments) | **10/27/10** |
| Oct 25Oct 27 | 1516 | Ordinary Diff. EquationsSystems of ODE | Notes + Chapters 10 and 11. | **HW5**: **S10.1** : Problems 3a, 6, 12  **S10.2** : Problems 2a,b,c, 7a, 14a **S10.3** : Problem 3, 4 **S11.2** : Problem 3, 7b  | **11/10/10** |
| Nov 1Nov 3 | 1718 | Boundary Value ProblemsBoundary Value Problems | Notes + Chapter 14  |
| Nov 8Nov 10 | 1920 | Parallel Programming**Partial Differential Equations** | Notes  |  **PA5:** An assignment on Ordinary Differential equations ( See assignments)  | **11/29/10** |
| Nov 15Nov 17  | 21  |  Heat ConductionREVIEW FOR TEST | Notes  |
| Nov 22Nov 24 |    | **SECOND TEST**THANKSGIVING |   |   |  |
| Nov 29Dec 1 | 2223 | **Partial Differential Eqs**. **Wave equation** **Partial Differential Eqs.**Laplace’s Equation | Notes + 15.1 + 15.2 |  **FE**: A take home final exam  |  |
| Dec 6Dec 8 | 2425 | **Partial Differential Eqs.**Laplace’s Equation | Notes + 15.3  |  |   |
| **TEXT: Numerical Mathematics & Computing (6th edition) by Cheney & Kincaid- Thomson Brooks/Cole**  |