**LEHIGH UNIVERSITY**

 **Department of Mechanical Engineering and Mechanics**

 **EMA 450 ADVANCED NUMERICAL METHODS Spring 07**

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| **Date** | **No** | **Weekly Topics** | **Weekly Reading** | **Assignments** |  **Due**  |
| Jan 15Jan 17 | 12 | Intro. EigenvaluesExact methods | C&K [ 8.3 & Appendix D] And NOTES | C&K :Problems**8.3** – 2, 3, 4, 8Computer Prob**8.3** – 1**8.4** - 1 | **Jan 31** |
| Jan 22Jan 24 | 34 | Power methodSimilarity transform.Jacobi Method | C&K [ 8.4 ] and NOTES |
| Jan 29Jan 31 | 56 | QR decompositionVEGA and Basic Unix | NOTES  | C&K :Problems**12.3** – 22, 26, 27, 28Computer Prob.**8.3** – 2, 6 | **Feb 14** |
| Feb 5Feb 7 | 78 | Singular Value DecompositionIMSL Libraries |  C&K [end of 8.3 & 12.3 pages 549-555] |
| Feb 12Feb 14  | 9 10 | Ordinary Differential Equations | NOTES  |  Assign. #3(see Web site) | **Feb 28** |
| Feb 19Feb 21 |  1112 | **REVIEW FOR TEST****FIRST TEST**  |   |
| Feb 26Feb 28 | 1314 | Partial Diff. Equations | NOTES |  Assign. #4(see Web site) | **Mar 12, 14, 21** |
| **SPRING BREAK** |
| **Date** | **No** | **Weekly Topics** | **Weekly Reading** | **Assignments** | **Due**  |
| Mar 12Mar 14  | 1112 |  Advanced Methods for Partial Diff. Equations | NOTES |  Assign. #5(see Web site) | **March 28** |
| Mar 19Mar 21 | 1314 | Parallel ProgrammingMPI introduction | NOTES   |
| Mar 26Mar 28 | 1516 | Fast Fourier Transforms | NOTES andN R [ Chapter 12] |  |  |
| Apr 2Apr 4 | 1718 | Parallel ProgrammingMPI introduction | NOTES |   |  |
| Apr 9Apr 11  | 19  20 | Finite Elements | NOTES |
| Apr 16Apr 18 |    | **REVIEW FOR TEST****SECOND TEST** |  |   |  |
| Apr 23 Apr 25 | 2122 | Monte Carlo Methods & Simulation | C&K [ Chapter 13 ] and NOTES |
| **Final Exam** |
| **C&K: Numerical Mathematics and Computing Cheney & Kincaid – 5th Edition** **N R : Numerical Recipes Press, Flannery, Teukolsky & Vetterling – Free on line** |