There are 24 lectures, 2 exams, and 2 project presentation classes scheduled.

0. (1 lecture)
   - Rules
   - Matlab
   - Cache

1. Floating point and errors (2 lectures)
   - IEEE
   - Organization
   - Important numbers
   - Errors

2. Vectors and Matrices (2 lectures)
   - Manipulating vectors and matrices
     - Matrix vector product
     - Cost
     - Cache
     - BLAS
     - Basis, Range, Domain
     - Orthogonality, Gram Schmidt
     - Matrix matrix product
     - Order of operations

3. Linear systems (2 lectures)
   - LU decomposition
   - Errors

4. Least Squares (2 lectures)
   - Norms
   - QR
     - Householder
     - Givens

5. Eigen-value decomposition (3 lectures)
   - Eigen values and eigen vectors
   - SVD
     - Well Posedness
     - PCA and reduced rank-approximation

6. Ordinary Differential Equations (5 lectures)
   - Numerical Solution of Initial Value Problems
   - Differential Algebraic equations
   - Boundary value problems
7. Optimization (5 lectures)
   • Unconstrained optimization
     • Newton and Secant Methods in 1-D
     • Simplex method (Nelder-Mead)
     • Multi-dimensional methods
     • Newton methods
     • Conjugate gradients
     • Line searches
   • Constrained optimization
     o Barrier methods
     o Reduced variable methods
   • Simulated Annealing
     o Metropolis Algorithm

8. Nonlinear Systems and Continuation (1 Lecture)
   • Newton Like methods
   • Homotopy methods

9. Monte Carlo Methods (3 lectures)
   • Basic Statistics: mean variance, central limit theorem
   • Monte-Carlo simulation
   • Integration
   • Importance sampling

Lecture numbers and topics to be covered are approximate, and only provided for guidance ...