

## Math 1H03

1. Linear systems of equations – 4 lectures (1.1,1.2,1.3)
  - Solutions and Elementary Operations
  - Gaussian Elimination
  - Homogeneous Equations
  
2. Matrices – 6 lectures (2.1,2.2,2.3,2.4)
  - Matrix Addition, Scalar Multiplication, and Transposition
  - Matrix Multiplication
  - Matrix Inverses
  - Elementary Matrices
  
3. Determinants – 7 lectures (3.1,3.2,3.3)
  - The Laplace Expansion
  - Determinants and Matrix Inverses
  - Diagonalization and Eigenvalues
  
4. Vectors in  $\mathbb{R}^2$  and  $\mathbb{R}^3$  – 5 lectures (4.1,4.2,4.3)
  - Vectors and Lines
  - The Dot Product and Projections
  - Planes and the Cross Product
  
5. The Vector Space  $\mathbb{R}^n$  – 7 lectures (5.1,5.2,5.3)
  - Subspaces
  - Spanning Sets
  - Independence
  - Dimension
  - Rank of a Matrix
  - Similarity and Diagonalization (and more on eigenvalues and eigenvectors)
  
6. Orthogonality – 4 lectures (7.1,7.2)
  - Projections
  - Gram-Schmidt Process
  - Orthogonal Diagonalization (and more on eigenvalues and eigenvectors)
  
7. Complex Numbers – 3 lectures (Appendix A)
  - Addition, Multiplication, Division
  - Conjugate, Modulus
  - Polar Form
  - De Moivre's Theorem and nth roots