**At the end of this chapter you should be able to**

1. Transform equations written in the natural variables of an applied problem to the canonical $Ax = b$ of linear algebra.
2. Explain the condition of consistency in terms of linear combinations of column vectors.
3. Explain the condition of singularity of an $n \times n$ matrix in terms of linear independence.
4. Express matrix rank as a measure of linear independence.
5. Relate rank of the coefficient matrix to the consistency of a $n \times n$ system of equations.
6. Solve a small system of linear equations using Gaussian elimination
7. Describe the most efficient procedures for solving $Lx = b$ or $Ux = b$ when $L$ is lower triangular and $U$ is upper triangular.
8. Describe the significance of $\kappa(A)$ on the reliability of the numerical solution to $Ax = b$.
9. Describe the reason for pivoting. Is pivoting a remedy for ill-conditioned systems?
10. Write (describe) a procedure for solving $Ax = b$ given an LU factorization of $A$.

*Note:* Sections of Chapter 8 *not* covered (and hence, you are not responsible for) are 8.4.2 (Cholesky factorization) and 8.5 (Nonlinear Systems of Equations)