I. Three types of muscle tissue
A. Skeletal (striated, voluntary)
B. Cardiac (striated, involuntary)
C. Visceral or Smooth (nonstriated, involuntary)
   1. Single Unit Smooth Muscle
   2. Multi-Unit Smooth Muscle

II. Basic Functions of Muscle
A. Movement (primary)
B. Maintain Posture
C. Heat Generation
D. Guard Openings
E. Support Soft Tissues

III. General Characteristics of Muscle
A. Excitability
B. Contractility
C. Extensibility
D. Elasticity

IV. Skeletal Muscle Gross Structure / Anatomy - each muscle is an organ
A. Modular Anatomy - divided by connective tissue sheaths called fascia
   1. Muscle (anatomically distinct organ)
      a. Epimysium – surrounds muscle
   
   2. Fascicles - bundles of muscle fibers
      a. Perimysium – surrounds fascicles
   
   3. Muscle Fibers (muscle cells)
      a. Endomysium - surrounds muscle fibers (cells)

B. Arrangement of Fascicles
   1. Parallel (straplike or fusiform)
   2. Pennate
   3. Convergent (triangular)
   4. Circular (sphincter)

C. Attachments - fascia are continuous with fascia throughout the body and it is via these fascia that muscles are attached to bone
   1. Direct Attachment
   2. Indirect Attachment
      a. tendons
      b. aponeurosis
V. Skeletal Muscle Microscopic Structure / Anatomy

A. Basic Cell Structure

B. Sarcolemma (plasma membrane)
   - transverse tubules (t-tubules)

C. Sarcoplasm (cytoplasm)
   1. Sarcoplasmic Reticulum (smooth endoplasmic reticulum)

2. Myofibrils
   a. I band
   b. A band
   c. H band
   d. M line
   e. Z line

   f. Myofilaments (cytoskeleton)
      - thick filaments - bundles of myosin proteins
      - thin filaments – 3 proteins
        actin
troponin
tropomyosin

3. Mitochondria

VI. Additional Concepts

A. Blood Supply

B. Fiber Types
   a. slow twitch
   b. fast twitch
   c. intermediate

VII. Physiology of Skeletal Muscle Contraction (in brief)

A. Sliding Filament Theory
   1. Actin-Myosin Interaction

B. Activation of Muscular Contraction
   1. Anatomy of the Synapse
      a. neuromuscular junction
      b. neuron terminal
      c. synaptic cleft
      d. motor end plate
      e. motor units
VIII. Smooth Muscle
   A. Structure / Anatomy
      1. Filament Arrangement
      2. Gap Junctions

   B. Types of Smooth Muscle (named for functional characteristics)
      1. Single Unit
      2. Multiple Unit

IX. Cardiac Muscle - to be covered in detail at a later time
   A. Structure / Anatomy
      1. Intercalated Disks

X. Clinical Significance (FYI)
   A. atrophy / hypertrophy
   B. strain / sprain
   C. cramp / spasm
   D. myasthenia gravis
   E. muscular dystrophy
   F. Multiple Schlerosis
   G. rigor mortis

XI. Additional Key Terms
    aerobic    anaerobic    ATP    atrophy    creatine phosphate    hypertrophy    isometric
    isotonic    tetanus (physiological)