Review for Exam One

Chapter One - What is Biomechanics
1. Biomechanics - concept
2. Branches of Biomechanics
   Statics and Dynamics; Linear and Angular Kinematics and Kinetics; Applications
3. Kinesiology vs Biomechanics
4. Common Biomechanical Instruments
   Cinematography/Videography, Force Platform, EMG

Chapter Two - Kinematic Concepts for Analyzing Human Motion
1. Anatomical Terminology
2. Reference System, Plane and Axis
3. Movement observed in the different joints of the body
4. Type of Motion:
   Linear, Angular, and General

Chapter Three - Kinetic Concepts for Analyzing Human Motion
1. Basic Concepts Related to Kinetics
   Mass, Inertia, Force, Pressure, Stress, Volume/Density, Torque
2. Mechanical Loadings
   Compression, Tension, Shear, Compressive and Tensile Stress, Strain, Bending, Torsion, Combined Loading
3. Vector Algebra
   Vector resolution, Composition, Addition, Graphical solution (Tip-to-tail), Math solution

Chapter Four - Biomechanics of Bone
1. Functions and characteristics
2. Composition and Structure of Bone Tissue
   Material contents, Types of Bone, Structure of a long bone, Compact vs spongy bone
3. Mechanical Characteristics
   Load-Defomation & Stress-Strain, Strength Characteristics (stiffness, anisotropic behavior)
4. Common fractures

Chapter Six - Biomechanics of Skeletal Muscle
1. Functions and characteristics
2. Structures
   Gross, Macro, Micro (sarcomere and sliding filament theory), Fiber types, MU types and recruitment
3. Mechanical Behaviors
   Types of Contraction;
   Force Production: Force-length (sarcomere and whole muscle), Force-velocity, Power-velocity, Force-time (EMD);
   Muscle Training Modalities - Isokinetic, isotonic, isometric exercises

Note: Bring following items to the test: 1) a calculator, 2) a ruler, and 3) a protractor.