**ES 335 Exam #3 Review**

* Structural vs. Material Properties
	+ Force length vs. stress-strain
		- Know what each represents
		- Know units
		- Regions of curves: elastic, plastic, yield, ultimate strength, failure
		- Stiffness vs. elastic modulus
* Viscoelastic properties
	+ Be able to explain and apply (provide an example) of the following:
		- Strain-rate dependent stiffness
		- Load-relaxation
		- Creep
		- Hysteresis
	+ Know what types of stretching utilize specific viscoelastic properties
* Tendon/ligament
	+ Functional and structural differences between tendon and ligament
	+ How is ligament/tendon strength affected by disuse?
* Skeletal system
	+ Composition of bone—understand the function of the different components
		- Cortical (compact) vs. cancellous (trabecular) bone
	+ Bone modeling (hypertrophy) vs. bone remodeling (atrophy)
		- role of osteoblasts and osteoclasts
	+ Wolf’s law
	+ How is bone strength affected by disuse?
	+ What happens with osteoporosis and how does it affect bone strength?
	+ Types of bone—know description, examples and function
		- Short bones
		- Long bones
		- Flat bones
		- Sesamoid bone
	+ Stress fracture vs. traumatic fracture
	+ Types of loading—know general bone strength in each
		- Compression
		- Tension
		- Bending
			* Be able to diagram a bone loaded in bending—C’s and T’s for compression and tension, location of fracture and side fracture will start on
		- Shear
		- Torsion
* Muscular system
	+ Muscle structure
		- Sarcomere
		- Sliding filament theory
	+ Agonists, antagonists, stabilizers (neutralizers)
	+ Functional muscle group
	+ Be able to perform a muscular analysis
	+ Factors that affect muscle torque output
	+ Factors that affect muscle force output
		- Physiological factors
			* Fiber type
			* Muscle CSA
		- Neural factors
		- Biomechanical factors
			* Muscle architecture
			* Force-length relationship
				+ Active insufficiency, passive insufficiency
				+ Be able to show relative position of different exercises on force length relationship
			* Force-velocity relationship
	+ Factors that affect muscle moment arm
	+ Be able to perform a strength curve analysis