

**HS 375: Structural Kinesiology  
Spring 2017**

School of Health, Exercise Science, and Athletics  
University of Wisconsin – Stevens Point

**Lecture:** Monday's & Wednesdays: 1:00–1:50pm Room 116 HEC

**Lab:** Wednesday's 2:00-2:50pm Room 116 HEC

**Instructor:** Rory Suomi, PhD, LPTA  
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**Office hours:** Monday 2:00 to 3:00 pm ; Tuesday 12:00 to 2:00 pm;  
or by appointment.

**Course description:** (3 credits) This course will be designed to help the student gain an understanding of the joints & muscles of the body and how they are involved in the science of movement.

**Course materials:**

Kinesiology, the Skeletal System & Muscle Function (2017), Muscolino, Joseph, Mosby-Elsevier, 3d ed. **(rental)**  
Strength Training Anatomy (2010), Delavier, Frederic; Human Kinetics., 3d ed..  
**(purchase)**  
Evolve Online Resources  
**Google Search : exrx.net** or to get Website: **http: www.exrx.net/**  
Hand-outs

**Course Objectives:** Stated after grading scale by chapter.

**Class schedule: Note this is tentative and subject to change.**

Mon, Jan 23d	Introduction (chapter 1)
Wed, Jan 25 <sup>th</sup>	Lecture (chapter 2 & 3)
Mon, Jan 30 <sup>th</sup>	Lecture <b>(ch. 3 &amp; 4)</b>
Wed, Feb 1 <sup>st</sup>	Lecture <b>(Ch. 6 &amp; 7)</b>
Mon, Feb 6 <sup>th</sup>	Review materials (ch. 1,2,3,4, 6 & 7)
Wed, Feb 8 <sup>th</sup>	<b>Test 1 (ch. 1,2,3,4,6 &amp; 7)</b>
Mon, Feb 13 <sup>th</sup>	Review test & ch. 14
Wed, Feb 15 <sup>th</sup>	Chapter 14 & 15
Mon, Feb 20 <sup>th</sup>	Chapter 15 & ch 17
Wed, Feb 22 <sup>nd</sup>	<b>Lab 1 Isotonic vs isometric strength</b> (lab times 1:00 to 3:00pm)
Mon, Feb 27 <sup>th</sup>	Chapter 17
Wed, March 1 <sup>st</sup>	Chapter 19
Mon, March 6 <sup>th</sup>	Ch. 19
Wed, March 8 <sup>th</sup>	<b>Lab 2. Levers</b> (lab times 1:00 to 3:00pm)

Mon, March 13 <sup>th</sup>	ch 19 & review for exam II
Wed, March 15 <sup>th</sup>	<b>Mid-term exam (chapters: 14,15,17 &amp; 19)</b>
Mon, March 27 <sup>th</sup>	Review exam II and chapter 10 (Upper extremity)
Wed, March 29 <sup>th</sup>	<b>Lab #3 Balance lab (1 to 3:00pm +)</b>
Mon, April 3 <sup>d</sup>	Ch 10
Wed, April 5 <sup>th</sup>	Ch 10
Mon, April 10 <sup>th</sup>	Ch. 10
Wed, April 12 <sup>th</sup>	Ch. 10
Mon, April 17 <sup>th</sup>	Ch 9 & hand-outs
Wed, April 19 <sup>th</sup>	<b>Lab # 4 (upper extremity exercise evaluation) Lab times from 1:00 to 3:00pm + ( meet at cardiocenter)</b>
Mon, April 24 <sup>th</sup>	Review exam and chapter 9 (lower extremity)
Wed, April 26 <sup>th</sup>	Ch. 9 & hand-outs
Wed April 26 <sup>th</sup>	<b>Exam III: Upper extremity (chapter 9 &amp; handouts) (6-8pm)</b>
Mon, May 1 <sup>st</sup>	Ch. 9 & hand-outs
Wed, May 3 <sup>d</sup>	Ch. 9
Mon. May 8 <sup>th</sup>	Ch. 9
Wed, May 10 <sup>th</sup>	<b>Lab # 5 (LE exercise evaluation) at cardiocenter (1:00-3:00pm)</b>

- Chapter 11 (attachments & actions of muscles will be studied on students own time and in two independent labs worth 40 pts each. **The first lab on UE must be finished prior to Wednesday, April 26<sup>th</sup> (1:00pm)** and the **second lab on the LE must be finished by Friday, May 12<sup>th</sup>, by noon**. These points would be added to your lab grade total and the grading % scale would be the same. One or two students may work on these labs and specific times as to when students can work on them will be provided after spring break. The materials covered in these labs will reflect ch. 11 and the information would be on exams 3 & 4.

**Final Exam Monday, May 15<sup>th</sup>, 10:30 am to 12:30pm**

**Attendance** is an expected part of this course, students are allowed 3 absences and upon their 4th absence will have 4 points deducted for each class missed. After 8 absences no points will be provided for attendance. Missed labs will be counted in the attendance policy as two absences and any missed lab assignments or quizzes may only be made up with prior approval of the instructor.

### Grading

Tests (T1 100, T2 120 T3 150 T4 150)	60%	520
Lab assgn. (7 x 40 points)	33%	280
<u>Participation (attendance)</u>	<u>7%</u>	<u>60</u>
<b>Total</b>		<b>860</b>

**Grading Scale :**

A = 791 - 860 (92-100%)	A- = 774 - 790.5 (90-91%)	B+ = 757 - 773.5 (88-89%)
B = 705 - 756.5 (82-87%)	B- = 688 - 704.5 (80-81%)	C+ = 671 - 687.5 (78-79%)
C = 619 - 670.5 (72-77%)	C- = 602 - 618.5 (70-71%)	D+ = 585 - 601.5 (68-69%)
D = 533 - 584.5 (62-67%)	F = < 533	

**Course objectives :**

## Chapter 1.

1. List the major divisions of the body
2. Identify the 11 major parts of the body.
3. Explain the difference between "true movement of a body part" compared with "going along for the ride"
4. Identify the major regions of the body.

## Chapter 2.

1. Describe the importance of anatomic position.
2. List and define the paired anatomical directional terminology.
3. List and describe the three cardinal planes
4. Explain the motions that occurs within a plane.
5. Define what an axis is and how the axes correspond to each of the three cardinal planes

## Chapter 3 &amp; 4

1. List the 5 major classifications of bones by shape and provide examples of each.
2. Describe the 5 major functions of bones.
3. Identify the 2 ossification sites of long bone from a developmental aspect.
4. Describe the 4 steps of healing of a fractured bone.
5. Explain the effect of physical stress on bone, in relationship to Wolff's law, both in positive and negative aspects.
6. Describe the structural make-up of cartilage and identify the three main types of cartilage and their primary location.
7. Compare the structure and function of tendons, ligaments and bursae .
8. Define and explain the properties of skeletal tissues in regards to concepts of stretch, elasticity, plasticity and creep.

## Chapter 6.

1. Describe joint function in relation to muscles, and ligaments/joint capsules.
2. Describe the relationship between joint mobility and joint stability.
3. Define range of motion and explained how it is measured.
4. Explain the differences between non-axial and axial motion.
5. Describe and explain the relationship between roll, spin and glide motions.
6. Define and explain the relationship between osteokinematic and arthrokinematic motions.
7. Define joint action terms and be able to demonstrate examples of each one.
8. Explain the concept of a reverse action and be able to demonstrate examples.
9. Explain on how drawing a vector can help us understand the actions of a muscle.

## Chapter 7.

1. Describe the key anatomical structures of a joint and list the 3 major structural types of joints.
2. Describe the physiology of a joint.
3. Describe the relationship between joint mobility and joint stability, and list the three major determinants of this relationship.
4. List the three major functional categories of joints.
5. Explain the key components to synovial joints.
6. Identify each major synovial joint of the appendicular skeleton by shape.
7. Describe and give examples of nonaxial synovial joints.
8. Explain the purpose of menisci and articular discs.

## Chapter 14.

1. State and define the three types of muscle contractions (isotonic, isometric and isokinetic)
2. Describe the relationship between the terms mover, antagonist, concentric contraction and eccentric contraction.
3. Explain the roles of concentric, eccentric and isometric contraction in regards to movement and stabilization.

## Chapter 15

1. List and define the 6 major roles that a muscle may have when contracting.
2. Compare and contrast the roles of mover and antagonist muscles.
3. State the muscle that is working during the action in question.
4. Describe the general relationship between fixators and neutralizers and the muscle that is working.
5. Describe the relationship between mobility and postural stabilization muscles.
6. Explain the concept of coordination as it relates to the role of muscles.
7. Define and provide an example of the concept of coupled actions in the body.

## Chapter 17.

1. Describe how a muscle can have a partial contraction and explain the Henneman size principle.
2. Explain the difference bet intrinsic and extrinsic strength of a muscle.
3. Describe various types of muscle fiber architecture and explain the advantages/disadvantages of longitudinal vs pennate muscles.
4. Explain the concept of leverage and how it is applied within the human body.
5. Identify the three types of lever classes and advantages and disadvantages of each type.
6. Define torque and explain the relationship of torque to length of lever arms.
7. Be able to calculate torque under different lever arm length situations and explain the relationship between torque production and length of lever arms.
8. Define and describe angle of pull and its effect on muscle contraction.
9. Define and describe line of pull and its effect on muscle contraction.

## Chapter 19.

1. Compare and contrast sensory, integrative and motor neurons.
2. Describe the structural and functional classifications of the nervous system.
3. Describe the difference between true reflexive behavior and learned/patterned behavior
4. Define reciprocal inhibition and describe how it can be used for muscle stretching.

5. Define and discuss proprioception
6. List the three major categories of proprioceptors and specific proprioceptors found in each major category.
7. Discuss the relationship between muscle spindles, Golgi tendon organs and muscle stretching.
8. Discuss the concept of muscle facilitation and muscle inhibition.
9. Describe the relationship between inner ear proprioceptors and its implications to body work and exercise.
10. Describe the mechanism and importance of bodywork and exercise to the pain-spasm-pain cycle.
11. Describe the mechanism of the gate theory, including the implications for bodywork and exercise.

#### Chapter 10.

1. Describe the major structural components of the following joints of the upper extremity: glenohumeral joint, shoulder joint complex, elbow joint and wrist joint.
2. Identify the planes and axes involved with each of those joints.
3. Identify specific muscles involved in each of those joints as well as origins and insertions of specified muscles.
4. Identify muscles involved in specific upper extremity strength exercises and be able to prescribe strength training exercises which work upper extremity joints effectively.

#### Chapter 9.

1. Describe the major structural components of the following joints of the lower extremity: pelvic girdle, hip, knee and ankle.
2. Identify the planes and axes involved with each of those joints.
3. Identify specific muscles involved in each of those joints as well as origins and insertions of specified muscles.
4. Identify muscles involved in specific lower extremity strength exercises and be able to prescribe strength training exercises which work lower extremity joints effectively.
5. Explain the reverse action relationships between pelvic movements and movements of the trunk and thighs.