



01/2010

College of Life Sciences

Department of Exercise Sciences



## ExSc 460-4 Orthopedic Impairment and Therapeutic Exercise Winter 2010

### Course Information

**Instructor:** Rike Mitchell, PhD, MSPT, MTC  
**Office:** 268 SFH, tel # (801) 422-3344  
**Office Hours:** Mo, We 9-11am, Tue 3-4pm  
**E-mail:** [rike\\_mitchell@byu.edu](mailto:rike_mitchell@byu.edu)

**Suggested Text:** Magee David J, *Orthopedic Physical Assessment* (5<sup>th</sup> edition), published by W.B. Saunders Company

**Catalogue Course Description:** Fundamentals of body mechanics and therapeutic exercise, coupled with kinesiological principles for detection and correction of basic neuromusculoskeletal anomalies.

**Extended Course Description:** This course is designed to prepare the prospective medical professional for his/her future schooling. It is intended to provide information about orthopedic disorders and practice in diagnosing them. This will be accomplished by improving observation and palpation skills as well as by teaching new testing techniques. It will also give you the opportunity to devise exercises for the treatment of those disorders. You will be able to incorporate your already acquired knowledge from your Exercise Sciences courses and gain a more complete understanding of how our body functions.

The expected learning outcomes are tailored to the major in Exercise Science. In the course catalog it says about the BS in Exercise Science: ... "While providing the requisite courses for medical school acceptance, it also conveys a healthy-lifestyle, preventive-medicine health care perspective." Accordingly, the outcomes are:

#### Expected Learning Outcomes

Students graduating with a BS degree in Exercise Science will have demonstrated a mastery of the exercise sciences that will allow them to succeed in graduate studies in the exercise sciences or health care professions, or as entry level employees. It is expected that Exercise Science students will develop a passion for learning about the human body and have a greater appreciation for its development, function, and divine nature. It is expected that graduates of this program:

1. Will demonstrate the learning objectives of each class.
2. Demonstrate a sound foundational knowledge and understanding of the principles of biology, chemistry, physics, and nutrition, and an advanced understanding of human anatomy and physiology as they relate to responses and adaptations to physical activity and exercise.

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3. Demonstrate basic laboratory skills pertaining to assessments, laboratory methods, sound experimental and analytical practices, data acquisition and reporting in the exercise sciences.
4. Demonstrate requisite skills and abilities for a career or continued education in various fields related to the exercise sciences.
5. Understand the importance and influence of physical activity and exercise on health and be an advocate physically active lifestyles as a means to improve quality of life and reduce the risk and prevalence of lifestyle related diseases.
6. Will gain meaningful employment in exercise science related areas or pursue graduate studies in an exercise science related area or one of the health care professions.

### **Course Expected Learning Outcomes or Learning Goals:**

#### Unit 1 Considerations in the treatment of orthopedic impairments

- Understand medical terminology
  - Use it correctly
- Describe normal movement
  - osteokinematics and arthrokinematics
  - roll and glide rule
- Understand the terms: isometric, isotonic, isokinetic exercises
  - Scrutinize exercise techniques for their value
  - Identify muscles being used during different exercise techniques
  - Develop appropriate exercises to treat different impairments
- Measure and evaluate strength and range of motion
  - Identify 5 grades of strength
  - Know close pack and loose pack positions
- Describe different stretching exercises
  - PNF

#### Unit 2 Foot and Gait

- Understand boney configuration of the foot
  - Describe sub-talar joint and explain motions
  - Analyze motions at different joints
- Describe foot deformities and their etiology
  - Hallux valgus, varus, rigidus
  - Toe deformities
  - Understand consequences to the whole body related to foot deformities
- Describe arches of the foot
  - Understand consequences of divergences of arches
  - Describe hindfoot and forefoot divergences
- Analyze gait patterns
  - Identify phases of gait and muscles involved
  - Understand efficient gait
  - Analyze kinematics of the involved joints
- Recognize abnormalities of gait
  - Understand muscle substitutions

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### Unit 3 Spine and Posture

- Describe the spine
  - Understand the functions of its components
  - Analyze and describe spinal movement
  - Explain the function of the intervertebral disc
    - Annulus fibrosus
    - Nucleus pulposus
    - Vertebral endplate
  - Recognize pathologies associated with the spine
    - Scoliosis
    - HNP
- Describe proper posture
  - Recognize different body types
  - Describe abnormal and improper posture
  - Know their consequences

### Unit 4 Lower and Upper Extremity

- Describe the healthy knee and hip
  - Bones, muscles, ligaments and normal kinetics
  - Tibial torsion, anteversion of hip
- Describe malalignment of different components
  - Genu valgum/varum; coxa valga/vara
- Describe lower extremity pathologies
  - Demonstrate tests associated with pathologies
- Describe healthy shoulder, elbow, wrist and hand
  - Bones, muscles, ligaments and normal kinetics
  - Know force couples at the shoulder
  - Explain scapulohumeral rhythm
- Describe pathologies associated with the upper extremity
  - Rotator cuff pathologies
  - Shoulder dislocation
  - Epicondylitis, carpal tunnel syndrome
  - RA and OA
  - Demonstrate tests associated with pathologies

*All these learning objectives are measured through written and laboratory examinations as well as the quizzes. Written examinations take the form of matching, multiple choice, listing and short answer questions. Laboratory reports are graded according to their accuracy and the quality of writing.*

### **Class Procedures:**

- This course will incorporate lecture, discussions and group activities. Lab assignments will support you in accomplishing the intended learning outcomes.
- There will be quizzes at the beginning of class, so please try to be punctual, as you will not be able to take the quiz later on
- I will give homework assignments, such as preparatory reading or answering of questions posed during class.

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- I expect that you as a member of your group are prepared and able to contribute to the group in completing the assignments, helping others in your group with their learning and understanding of the concepts, and ultimately deepening your own learning

**Exams:** There will be four tests.

**Quizzes:** The best ten of the weekly quizzes will count towards the final grade.

**Lab Assignments:** There will be 7 labs, highlighting hands on experience and trying to tie all information together and hopefully give you a bigger picture of the pathology/impairment.

They will cover (with tentative dates):

- Exercise concepts and arthrokinematics (1/20),
- Ankle/foot (2/10),
- Gait (2/26),
- Spine (3/15),
- Posture (3/22),
- Knee/hip (4/2)
- and upper extremity (4/12)

The lab reports can each earn you 15 points if completed within 1 week and if the written recap is satisfactory. Each lab instruction sheet will give you more detailed instructions.

### Exams

1.	Introductory Material, arthrokinematics, exercise	200 points
2.	Ankle, Foot and Gait	200 points
3.	Spine, Posture	200 points
4.	Upper and Lower Extremities	200 points
4.	Lab Reports	105 points
5.	Quizzes	<u>100 points</u>

**Total possible points possible**

**1005 points**

### Exam and quiz grading:

(Out of 1000 points)

Percentage	Grade	Points	Percentage	Grade	Points
100%–94%	A	>940	79%–77%	C+	799–770
93%–90%	A-	939–900	76%–73%	C	769–730
89%–97%	B+	899–870	72%–70%	C-	729–700
86%–83%	B	869–830	69%–67%	D+	699–670
82%–80%	B-	829–800	66%–60%	D	669–600
			<60%	E	<600

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## Proposed Test Schedule for ExSc 460 (testing center)

- **Exam 1 (1/23 - 1/26)**
  - introduction, definitions, exercise concepts
  - arthrokinematics
- **Exam 2 (2/27 - 3/2)**
  - ankle/foot/gait
- **Exam 3 (3/23 - 3/26)**
  - spine/posture
- **Exam 4 (4/21)**
  - Upper/lower extremities
- **Final (= exam 4): (finals week)**

### H1N1 Flu

Students who have influenza-like illness should stay away from others for at least 24 hours after their fever is gone except to get medical care. Your fever should be gone without the use of a fever-reducing medicine such as Tylenol. Please communicate with your instructor regarding your attendance.

### Preventing Sexual Harassment

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university, but to students as well. If you encounter unlawful sexual harassment or gender based discrimination, please talk to your professor; contact the Equal Employment Office at 801-422-3863; or contact the Honor Code Office at (801) 422-2847.

Please be aware that you will touch each other when palpating for bony/muscular landmarks. If you feel uncomfortable about this, talk to me before class and we will find a solution.

### Students with Disabilities

Brigham Young University is committed to providing a working and learning atmosphere which reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the University Accessibility Center (UAC) – see the following (which is off their website):

It is the student's obligation to request academic adjustments to accommodate a disability and to assist the university through an interactive process to identify appropriate and effective academic accommodations. Disabled students needing and desiring an accommodation in the classroom or other school-related activity should contact the University Accessibility Center (UAC), 1520 WSC, Telephone 801-422-2767. UAC personnel will document the disability and determine appropriate accommodations.

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I have been asked what I mean by **word of honor**,  
I will tell you.  
Place me behind prison walls—  
walls of stone ever so high, ever so thick, reaching ever so far into the ground—  
there is a possibility that in some way or another I may escape;  
but stand me on the floor and draw a **chalk line** around me  
and have me give my **word of honor** never to cross it.  
Can I get out of the circle?

No. Never!

I'd die first!

*Karl G. Maeser*

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