

Musculoskeletal Health Research A – Biomedical and Bioengineering Concepts (MSK 9000)

COURSE: Musculoskeletal Health Research A: Biomedical and Bioengineering Concepts (MSK 9000)

COURSE MEETS: Unless otherwise specified  
Fall Term, Tuesdays and Thursdays 4:00 to 5:30 PM

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## COURSE DESCRIPTION

This is a graduate level half-course developed for the Collaborative Training Program in Musculoskeletal Health Research. These are transdisciplinary programs involving trainees from all realms of musculoskeletal research, including biomedical, clinical, engineering, health services and population health research.

## OBJECTIVES

Specific core concepts have been identified with which all MSK trainees should be knowledgeable. These concepts have been integrated into two half-courses:

- *Musculoskeletal Health Research A: Biomedical and Bioengineering Concepts (MSK 9000)*
- *Musculoskeletal Health Research B: Fundamental Concepts in Clinical and Health Services Research (MSK 9100)*

Material in both courses is taught at a level so that it is accessible by all participants (*i.e.* aimed at the non-specialist). For example, concepts in molecular biology are described at a level understandable by engineering graduate students. Similarly, engineering principles are presented so that they are clear to a graduate student in the biological sciences. The goal is to provide trainees from a variety of backgrounds with a common base of knowledge in musculoskeletal research concepts and terminology. By the end of these courses, students will be able to discuss musculoskeletal research with their peers from other disciplines, understand seminars on a broad range of musculoskeletal research topics, and comprehend publications from all realms of musculoskeletal research (biomedical, clinical, engineering, health services and population health research).

## Schedule - Fall term 2016

### Musculoskeletal Health Research A – Biomedical and Bioengineering Concepts (MSK 9000)

Course consists of lectures, lab modules, discussions and assigned paper presentations by students.

#### Introduction to Biomedical and Bioengineering Concepts (Weeks 1 & 2)

Tues Sept 13	Introduction to cells and macromolecules	Séguin	90 min	(B7-200 UH)
Thurs Sept 15	Introduction to Bioengineering concepts	Hosein	90 min	(B7-200 UH)
Tues Sept 20	Joint cells and tissues; Intro to MSK diseases	Séguin	90 min	(B7-200 UH)

#### \*Lab Module\*

Thur Sept 22	Cell and Molecular biology	Séguin	9:30-12:30	(DSB0034)
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#### Animal Models of Musculoskeletal Diseases (Week 3)

Tues Sep 27	Large animal models for MSK diseases	El-Warrak	90 min	(B7-200 UH)
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#### \*Lab Module\*

Thur Sep 29	Lab module, West Valley Building	El-Warrak	9:00-12:00	(TBA)
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#### Musculoskeletal Genetics (Weeks 4 & 5)

Tues Oct 4	Introduction to genetics	Beier	90 min	(B7-200 UH)
Thurs Oct 6	Genomics and proteomics, genetic animal models	Beier	90 min	(B7-200 UH)
Tues Oct 11	Student paper presentations	Beier/Seguin	90 min	(B7-200 UH)

#### Midterm Exam (Week 6)

Tues Oct 18		Séguin/ Beier/ El-Warrak	60 min	(B6-213 UH)
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#### Musculoskeletal Physiology (Weeks 7 & 8)

Tues Oct 25	Skeletal development and growth	Dixon	90 min	(B7-200 UH)
Thurs Oct 27	Endocrinology and bone remodeling	Dixon	90 min	(B7-200 UH)
Thurs Nov 3	Student paper presentations	Dixon/ Beier	90 min	(B7-200 UH)

#### Biomaterials and Tissue Engineering (Weeks 9 & 10)

Tues Nov 8	Tissue engineering and regenerative medicine	Hamilton	90 min	(B7-200 UH)
Thur Nov 10	Metals, alloys, polymers and scaffolds	Rizkalla	90 min	(B7-200 UH)
Thur Nov 17	Student paper presentations	Hamilton/Rizkalla	90 min	(B7-200 UH)

#### Biomechanics (Weeks 11 & 12)

Tues Nov 22	Anatomy of the joint, force analyses and kinematics	Johnson	90 min	(B7-200 UH)
Thur Nov 24	Mechanical properties of MSK tissues and implants	Ferreira	90 min	(B7-200 UH)
Thur Dec 1	Student paper presentations	Johnson/Ferreira	90 min	(B7-200 UH)

#### Final exam

Thur Dec 8		All instructors	90 min	(B7-200 UH)
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#### STUDENT EVALUATION

Online quizzes (15%)

Student Debates (25%)

Midterm Exam (25%)

Final Exam (35%)

**Please Note:** The schedule and procedures outlined above are subject to change in the event of extenuating circumstances.

**Academic Honesty:** Academic honesty is a cornerstone of conduct at a university and we cannot have freedom of expression without integrity. Students are responsible for understanding the nature of and avoiding the occurrence of plagiarism and other academic offences; please refer to the section on "Scholastic Offences" on the web at [http://www.uwo.ca/univsec/handbook/appeals/scholastic\\_discipline\\_grad.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_grad.pdf) Such offences include plagiarism, cheating on an examination, submitting false or fraudulent assignments or credentials, impersonating a candidate, or submitting for credit in any course any academic work for which credit has previously been obtained or is being sought in another course in this University or elsewhere (without the knowledge and approval of the instructor to whom the work is submitted).