


**Department of Physiology and Pharmacology
PHYSPHRM 4530B – Skeletal Health and Disease**

Course Syllabus for Winter 2025



Western University is committed to a **thriving campus**; therefore, your health and wellness matter to us! The following link provides information about the resources available on and off campus to support students: <https://www.uwo.ca/health/> Your course coordinator can also **guide you** to resources and/or services should you need them.

1. Technical Requirements:



Stable internet connection



Laptop or computer

2. Important Dates:



Classes Begin	Reading Week	Classes End	Study day(s)	Exam Period
January 6	February 15–23	April 4	April 5–6	April 7–30

March 31, 2025: Last day to withdraw from second-term half course without academic penalty

3. Contact Information

Course Coordinator	Contact Information
Matthew W. Grol	Email at mgrol2@uwo.ca

Instructor(s)	Contact Information
Tom Appleton	Tom.Appleton@sjhc.london.on.ca
Frank Beier	fbeier@uwo.ca
Cheryle Séguin	cheryle.seguin@schulich.uwo.ca
Teaching Assistant	
Alexander Rico	arico@uwo.ca

4. Course Description and Design

Musculoskeletal disorders such as osteoarthritis, osteoporosis, and disc degeneration have huge impacts on individuals' quality of life and the healthcare system, especially as our population ages. Recent evidence shows that events that are physiologically linked to the skeleton can drive pathology in other tissues, such as mineralization of blood vessels in atherosclerosis. This course will provide an overview of the development and biology of skeletal tissues, introduce current techniques used to study skeletal physiology, and examine the biological bases of musculoskeletal diseases and their treatments.

Delivery Mode/ Location: In-person/ Dental Sciences Building, Room 2016

Course Requisites: Phys 3120 (Human Physiology); Phys 3140A (Cellular Physiology)

Note about Course Requisites: Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course, and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Timetabled Sessions

Component	Date(s)	Time
Lecture & Debate Presentations	Wednesdays	9:30-11:20 a.m.

- Asynchronous pre-work must be completed prior to sessions
- Attendance at sessions is required
- Missed work should be completed within [72 hours] of the original deadline

All course material will be posted to OWL: <https://westernu.brightspace.com/d2l/login>. Any changes will be indicated on the OWL site and discussed with the class.

If students need assistance, they can seek support on the [OWL Brightspace Help](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be contacted by phone at 519-661-3800 or ext. 83800.

Current versions of all popular browsers (e.g., Safari, Chrome, Edge, Firefox) are supported with OWL Brightspace; what is most important is that you update your browser frequently to ensure it is current. All JavaScript and cookies should be enabled.

5. Learning Outcomes

Upon successful completion of this course, students will be able to:

- Understand the structure and function of the musculoskeletal system and its contributions to systemic health
- Understand the pathophysiology of common musculoskeletal disorders.
- Understand basic research methods in this area.
- Interpret and design experiments in musculoskeletal biology and health.
- Critically assess basic research publications relevant to musculoskeletal health.
- Understand the impacts of sex, race, and socioeconomic status on musculoskeletal disease and interventions.

6. Course Content and Schedule

WEEK	DATES	TOPIC	INSTRUCTOR
1	Jan 8	Introduction to the Skeleton and Skeletal Development	Beier
2	Jan 15	Cartilage Biology and Pathology of Osteoarthritis	Appleton
3	Jan 22	Bone Biology and Repair	Grol
4	Jan 29	Metabolic Bone Diseases (Grol) Disorders of Ectopic Ossification (Beier)	Grol/ Beier
5	Feb 5	Student Debate #1 (cartilage, OA) Student Debate #2 (bone biology/ pathology)	Beier/ Grol
6	Feb 12	Student Debate #3 (ectopic bone formation) Research Methods in Musculoskeletal Biology (and Review for Midterm)	Beier/ Grol
7	Feb 19	Reading Week (starts February 15 th)	
8	Feb 26	Midterm – In Class	
9	Mar 5	Spine Biology and Common Spine Disorders	Séguin
10	Mar 12	Tendon and Muscle Biology	Grol
11	Mar 19	Student Debate #4 (tendon biology) Student Debate #5 (IVD development)	Grol/ Séguin
12	Mar 26	Skeletal Regeneration and Tissue Engineering	Grol
13	Apr 2	Musculoskeletal Mechanobiology	Séguin

7. Participation and Engagement

- Students are expected to participate and engage with content as much as possible
- Students can participate during class by asking or answering questions
- Students can also participate by interacting in the forums with their peers and instructors

8. Assessment and Evaluation

Below is the evaluation breakdown for the course. Any deviations will be communicated.

Assessment	Format	Weighting	Due Date	Flexibility
Online Quizzes	Multiple choice/ short answer	10%	Throughout term	Drop lowest quiz
Midterm Test	Mixed format	25%	Feb 26, 2025	Not applicable

Essay & Infographic	Written/ Illustration	15%	Mar 21, 2025	72-hour no late penalty
Debate	Oral Presentation	15%	Throughout term	Alternative assignment
Final Exam	Mixed format	35%	TBD	Not applicable

The **midterm test** and **final exam** will consist of short answer questions and one long-answer essay format question based on lecture materials, any information posted on the course OWL Brightspace site, and any assigned reading. The final exam is cumulative, but with emphasis on the material taught after the midterm.

Online quizzes will be posted on the course OWL Brightspace site following each debate and remain open for 1 week. Questions will be based on the debate papers, including relevant methodologies, results, and overall discussion of the debate topic. Quizzes will be open book but must be completed by each student individually. Quiz answers will be graded as submitted written assignments and assessed for textual similarity. Detection of plagiarism will result in a grade of 0.

The **in-class student debates** will be structured as outlined on the course OWL Brightspace site. Groups for the debates will be assigned randomly. In the case of a student absence on the day of their scheduled debate presentation, said student will be expected to prepare a 3-4 page (~1,500 word) “News and Views” style report on the 2 assigned scientific journal papers (i.e., both sides of the debate). Examples of such “News and Views” reports can be found at: <https://www.nature.com/nature/articles?type=news-and-views&year=2019>. This “make-up” assignment will be due 1 week after the scheduled debate presentation.

The **essay & infographic assignment** will be structured as outlined on the course OWL Brightspace site. Each student will select a disease by the end of January 2025 and write a one-page essay summarizing 1) disease features, 2) age of onset, 3) contributions of genetics, environment, sex/gender, and race to age of onset and disease presentation, and 4) current therapies and the impacts of sex/gender and race on therapeutic efficacy. This essay will be supplemented with a Health Canada-style infographic that compliments the essay content in a visual format. See the following for examples: https://www.canada.ca/content/dam/hc-sc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-canada-2021/64-03-19-2536_CCDSS-Osteoporosis-infographic_en-web.pdf.

Designated Assessment: Instructors are permitted to designate one assessment per course per term as requiring supporting documentation to receive academic consideration. See below for information on academic consideration policy and missed course work. For this course, the following assessment has been designated as requiring supporting documentation:

- In-Class Midterm on February 26th from 9:30-11:20 a.m. in DSB 2016

Information about flexibility in assessment

- Flexibility in assessment has been applied to this course; therefore, academic consideration requests may be denied on the assessments where flexibility is included.
- For the **online quizzes**, there are 5 quizzes with only 4/5 quizzes counted towards your final grade. Academic consideration will not be granted for missed quizzes. Students will receive a grade of zero for any missed quizzes within the required 4 quizzes.
- For the **student debates**, there is an alternative assignment (details outlined above) for students who miss the in-class debate. Students who miss the in-class debate must submit their written “News and Views” style report 1 week after the scheduled debate presentation – details can be found above in the course outline. A late penalty of 10% per day will be subtracted from the assessed grade for the alternate “News and Views” style report for each day it is submitted past the deadline. Academic consideration will not be granted for the student debate given the flexibility provided by the alternate assignment. If you have a long-term academic consideration or an accommodation for disability that allows greater flexibility than provided here, please reach out to

- Dr. Grol at least one week prior to the posted deadline.
- For the **essay/ infographic assignment**, students are expected to submit by the deadline listed. Should illness or extenuating circumstances arise, students are permitted to submit their essay/ infographic assignment up to 72 hours past the deadline without a late penalty. Should students submit this assignment beyond 72 hours past the deadline, a late penalty of 10% per day will be subtracted from the assessed grade. Academic consideration will not be granted for the essay/ infographic assignment given the deadline flexibility provided. If you have a long-term academic consideration or an accommodation for disability that allows greater flexibility than provided here, please reach out to Dr. Grol at least one week prior to the posted deadline.

General information about assessments

- All assignments are due at 11:59 p.m. EST unless otherwise specified.
- Students are responsible for ensuring that the correct file version is uploaded; incorrect submissions including corrupt files could be subject to late penalties (see below) or a 0.
- Written assignments will be submitted to Turnitin (statement in policies below).
- Students will have one submission to Turnitin per written assignment.
- Rubrics will be used to evaluate assessments and will be posted with the instructions.
- A student might not receive the same grade as their group members if it is determined that the distribution of work or contribution was not equal.
- After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days.
- Any grade appeals on assignments, quizzes, or midterms must be received within 3 weeks of the grade being posted.

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work which is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	below 50	Fail

Information about late or missed assessments:

- Late assessments without academic consideration will be subject to a late penalty of 10% per day.
- Late assessments with accommodation must be submitted within 24 hours of the end of the accommodation.
- One make-up test will be offered within 48-72 hours of the midterm OR the weight of the missed midterm test will be transferred to the final exam (only with permission of the course coordinator, Dr. Grol).
- The following course components must be passed to pass the course: in-class student debate (or alternate assignment), essay/ infographic assignment, and final exam. If an assessment and/or make-up assessment is missed with documentation, the student will receive an INC and must complete the task the next time the course is offered.

INC (Incomplete Standing): If a student has been approved by the Academic Advising Office (in consultation with the instructor/department) to complete term work at a later date, an INC will be assigned. Students with INC will have their course load in subsequent terms reduced to allow them to complete outstanding course work. Students may request permission from Academic Advising to carry a full course load for the term the incomplete course work is scheduled.

SPC (Special examination): If a student has been approved by the Academic Advising Office to write a Special Examination and the final exam is the only outstanding course component, an SPC will be assigned. If the class has a makeup exam, the student is expected to write the makeup exam. If the class doesn't have a makeup exam or the student misses the makeup exam for reasons approved by the Academic Advising Office, the student will write the exam the next time the course is offered. Outstanding SPCs will reduce the course load for the term the exam is deferred as outlined in [Types of Examinations](#) policy.

9. Communication

- Students should check the OWL Brightspace site every 24–48 hours.
- Students should email their instructor(s) and teaching assistant(s) using OWL Brightspace or email.
- Emails will be monitored daily; students will receive a response in 24–48 hours.
- This course will use OWL Brightspace discussion forums.
- Students should post all course-related queries on the OWL Brightspace discussion forum so that everyone can access the questions and responses.

10. Office Hours

- Office hours will be held in-person or remotely using Zoom at the discretion of the instructor/ TA.
- Office hours will be scheduled as requested and booked.
- Office hours can be either individual or group.

11. Resources

- All resources will be posted in OWL Brightspace.
- NO required textbook.
- NO required study guide.

12. Professionalism & Privacy

Western students are expected to follow the [Student Code of Conduct](#). Additionally, the following expectations and professional conduct apply to this course:

- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared (e.g., Must Knows Facebook group, Course Hero, Chegg, etc.)
- Recordings are not permitted (audio or video) without explicit permission.
- Permitted recordings are not to be distributed.
- Students will be expected to take an academic integrity pledge before some assessments.

Western is committed to providing a learning and working environment that is free of harassment and discrimination. All **students**, staff, and faculty have a role in this commitment and have a responsibility to ensure and promote a safe and respectful learning and working environment. Relevant policies include Western's [Non-Discrimination/Harassment Policy](#) (M.A.P.P. 1.35) and [Non-Discrimination/Harassment Policy – Administrative Procedures](#) (M.A.P.P. 1.35). Any **student**, staff, or faculty member who experiences or witnesses' behaviour that may be harassment or discrimination **must report the behaviour** to the Western's [Human Rights Office](#). Harassment and discrimination can be human rights-based, which is also known as EDI-based, (sexism, racism, transphobia, homophobia, islamophobia, xenophobia, antisemitism, and ableism) or non-human rights-based (personal harassment or workplace harassment).

13. How to Be Successful in this Class

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule your time throughout the course.
2. Make it a daily habit to log onto OWL Brightspace to ensure you have seen everything posted to help you succeed in this class.
3. Follow checklists created on OWL Brightspace or create your own to help you stay on track.
4. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively than just reading or watching the videos.
5. Connect with others. Try forming an online study group and try meeting on a weekly basis for study and peer support.
6. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

14. Western Academic Policies and Statements

A. Absence from Course Commitments

Students must familiarize themselves with the Policy on [Academic Consideration – Undergraduate Students in First Entry Programs](#)

Students missing course work for medical, compassionate, or extenuating circumstances can request academic consideration by completing a request at the [central academic consideration portal](#). Students are permitted one academic consideration request per course per term **without** supporting documentation. Note that supporting documentation is **always** required for academic consideration requests for examinations scheduled by the office of the registrar (e.g., December and April exams) and for practical laboratory and performance tests (typically scheduled during the last week of the term).

Students should also note that the instructor may **designate** one assessment per course per term that requires supporting documentation. This designated assessment is described elsewhere in this document. Academic consideration requests may be denied when flexibility in assessment has already been included. Examples of flexibility in assessment include when there are assessments not required for calculation of the final grade (e.g. 8 out of 10 quizzes) or there is flexibility in the submission timeframe (e.g. 72 hour no late penalty period).

Please note that any academic considerations granted in this course will be determined by the instructor of this course, in consultation with the academic advisors in your Faculty of Registration, in accordance with information presented in this course syllabus. Supporting documentation for academic considerations for absences due to illness should use the [Student Medical Certificate](#) or, where that is not possible, equivalent documentation by a health care practitioner.

Accommodation for Religious Holidays

Students should review the policy for [Accommodation for Religious Holidays](#). Where a student will be unable to write examinations and term tests due to a conflicting religious holiday, they should inform their instructors as soon as possible but not later than two weeks prior to writing the examination/term test. In the case of conflict with a midterm test, students should inform their instructor as soon as possible but not later than one week prior to the midterm.

Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found [here](#).

B. Academic Offenses

Scholastic offences are taken seriously, and students are directed [here](#) to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

C. Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation or review [The policy on Accommodation for Students with Disabilities](#)

D. Correspondence Statement

The centrally administered **e-mail account** provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts [here](#).

E. Discovery Credit Statement

Students are permitted to designate up to 1.0 Discovery Credit course (or equivalent) for pass/fail grading that can be counted toward the overall course credits required for their degree program. The details of this policy and the deadlines can be found [here](#).

F. Turnitin and other similarity review software

All assignments will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and [Turnitin.com](#).

15. BMSUE Academic Policies and Statements

Cell Phone and Electronic Device Policy (for in-person tests and exams)

The Schulich School of Medicine & Dentistry is committed to ensuring that testing and evaluation are undertaken fairly across all our departments and programs. For all tests and exams, it is the policy of the School that any electronic devices, e.g., cell phones, tablets, cameras, smart glasses, smart watch or iPod are strictly prohibited. These devices MUST be left either at home or with the student's bag/jacket at

the front of the room and MUST NOT be at the test/exam desk or in the individual's pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam. Non-programmable calculators are only allowed when indicated by the instructor. The program is not responsible for stolen/lost or broken devices.

Copyright and Audio/Video Recording Statement

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

Rounding of Marks Statement

Across the Basic Medical Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.45 becomes 74, and 74.50 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g., a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

Statement on the use of Generative Artificial Intelligence (AI) Platforms

Within this course, students are permitted to use AI tools ONLY for information gathering and preliminary research purposes. These tools are intended to enhance the learning experience by providing access to diverse information sources. However, it is essential that students critically evaluate the obtained information, exercise independent thinking, and engage in original research to synthesize and develop their own ideas, arguments, and perspectives. The use of AI tools can serve as a starting point for exploration, with students expected to uphold academic integrity by appropriately attributing all sources and avoiding plagiarism. Assignments should reflect the students' own thoughts and independent written work. By adhering to these guidelines, students contribute to a responsible and ethical learning environment that promotes critical thinking, independent inquiry and allows them to produce original written contributions.

16. Support Services

- Students who are in emotional/mental distress should refer to Mental Health @Western Health <https://www.uwo.ca/health/> for a complete list of options about how to obtain help.
- To connect with a case manager or set up an appointment, please contact support@uwo.ca.
- Other important links:
 - [Academic Advising \(Science and Basic Medical Sciences\)](#)
 - [Appeal Procedures](#)
 - [Registrarial Services](#)
 - [Student Development Services](#)
 - [Student Health Services](#)

Statement on Gender-Based and Sexual Violence

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at:

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.