

Human Molecular Genetics
Biology (4560B)
Course Outline/Syllabus Winter 2024

1. Course Information and Prerequisites:

Bio 3592, Bio 3596 and any bio course at level 3000 or above

Prerequisites: Unless you have either the prerequisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) 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 if you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Professor	Email	Office	Phone	Office Hours
Miodrag Grbic	mgrbic@uwo.ca	WSC 342	519-661-2111 X 67776	9:30-10:30 Tu Thu in person or zoom and/or other time on demand
GTAs:				

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

3. Course Description, Learning Outcomes, Schedule, Delivery Mode

Course Description: In this course, we will focus on the human genome, the molecular basis of human genetic disease, genetics of polygenic diseases and traits, genome evolution, non-coding RNA, chromatin re-modeling, molecular aspects of cancer genetics, epigenetics, stem cell biology particularly relevant to human disease - including the application of iPS cells, therapy of genetic disease, pharmacogenetics, biochemical genetics, advances in gene mapping, and functional genomics. Studies in model organisms are included where they show novel insights into disease.

Learning Outcomes and Objectives: By the end of this course, students will have:

- a) Will have a broad knowledge of approaches, problems, and tools in Human Molecular biology studies focusing on genome and genomic/genetic approaches
- b) Will gain knowledge on the genetics of human diseases and novel approaches to disease detection, diagnosis, and treatments
- c) Will be able to read and critically analyze primary literature and apply knowledge to new situations

Contingency Plan: This course will be delivered in-person, however in the unlikely event of any university-declared emergency, some or all of this course may be required to be delivered online, either synchronously or asynchronously. *The grading scheme will not change.* Any assessments affected will be conducted online as determined by the professor.

TENTATIVE CALENDAR 2024: *Students will be informed in advance of any upcoming changes.*

Day	Date	Content	Labs/ Tutorials
	8 Jan	First day of classes	
	17-25 Feb	Spring Reading Week	
	29 Mar	Good Friday holiday	
	8 Apr	Last Day of Classes	
	9-10 Apr	Study days	
	11-30 Apr	Final Exam period	

4. Course Materials

Course plan (see also course planning description)

Lectures tentative schedule (pages given based on Strachan 4th edition):

- 1) Tuesday Jan. 9. Human Molecular Biology: Introduction :
Why is human genetics important?
- 2) Thursday Jan. 11. Human genome project and organization of the human genome I p.256-294
- 3) Tuesday Jan. 16. Human genome project and organization of the human genome II p.256-294
- 4) Thursday Jan. 18. Studying the gene function in post genomic era p. 382-404
- 5) Tuesday Jan. 23. Comparative Genomics and Evolution of Human genome I p. 297-339
- 6) Thursday Jan. 25. Comparative Genomics and Evolution of Human genome II p. 297-339
- 7) Tuesday Jan. 30. Human gene expression I p. 347-378
- 8) Thursday Feb. 01. Human gene expression II p.347-378
- 9) Tuesday Feb. 6. Human Genetic variability and its consequences I p. 406-438
- 10) Thursday Feb. 8. Human Genetic variability and its consequences II p. 406-438
- 11) Tuesday Feb. 13. Identification of human disease genes and susceptibility factors I p. 498-535
- 12) Thursday Feb. 15. **In class first mid-term to be confirmed (30% grade before March 1)**
Tuesday Feb. 20. Reading week
Thursday Feb. 22. Reading week
- 13) Tuesday Feb. 27. Identification of human disease genes and susceptibility factors II p. 498-535
- 14) Thursday Feb. 29. Pharmacogenetics, personalized medicine and population screening I p. 606-637.
- 15) Tuesday Mar. 5. Pharmacogenetics, personalized medicine and population screening II p. 606-637.
- 16) Thursday Mar. 7. Cancer genetics I p. 538-567.

- 17) Tuesday Mar. 12. Cancer genetics II p. 538-567.
- 18) Thursday Mar. 14. Genetic approaches to treating disease I p. 678-716
- 19) Tuesday Mar. 19. Genetic approaches to treating disease II p. 678-716
- 20) **Thursday Mar. 21. In class second midterm to be confirmed (30% grade; 15 days before end of term)**
- 21) Tuesday Mar. 26. Genetic manipulation of animals for modeling diseases and investigating gene function I p. 640-672
- 22) Thursday Mar. 28. Genetic manipulation of animals for modeling diseases and investigating gene function II p. 640-672
- 23) Tuesday April. 2. Genetic testing of individuals I p. 569-601
- 24) Thursday April. 4. Life style and health.

Final assignment due: April 15th (to be deposited to course dropbox)

Required Equipment:



Stable internet connection



Laptop or computer with webcam



Working microphone

Required Reading, textbook: Human Molecular Genetics / Edition 4 or 5 (Tom Strachan & Andrew Read) and selected papers from primary literature

All course documents and information (syllabus, lecture files, instructional documents, required readings, etc.) **will be posted to OWL and students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for updates.** If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk, which can be contacted by phone at 519-661-3800 or ext. 83800.

Personal Response Systems ("Clickers") are not used in this course.

5. Methods of Evaluation

The overall course grade will be calculated as:

The overall course grade will be calculated as listed below:

First Midterm	30%
Second Midterm	30%
Final assignment	40%

The course utilizes two mid-term exams and a final assignment as an assessment tool. The mid-term exams are testing knowledge and understanding of the genetics of human disorders and human basic functions. The format of the exam is problem-solving and interpretation of the data. The final assignment is placing students in the role of a scientist analyzing key primary literature paper and applying knowledge acquired in the course for solving novel problems not presented in the course. The format of exams is tailored not to test student's stress response but to provide an environment stimulating creative and critical thinking.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

7. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Accommodation Policies:

Students with disabilities work with Accessible Education (formerly SSD), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf),

8. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

[Optional; Duplicated from Section 2] In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

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 their official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

All required papers may 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 The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

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

Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets

the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

Professionalism & Privacy:

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

- Students are expected to follow online etiquette expectations provided on OWL
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared
- 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
- All recorded sessions will remain within the course site or unlisted if streamed

Optional: Terms of Use of Lecture/Lab/Tutorial Content:

Scholastic offences: are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Plagiarism: Plagiarism is an academic offense and will not be tolerated. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author they must acknowledge their debt both by using quotation marks where appropriate, and by proper and accurate referencing in the form of scientific citations. All required papers 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 The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Statement on Use of Electronic Devices During Tests/Exams:

Optional: Statement Use of Electronic Devices While Viewing Graded Tests/Exams in Class:

9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

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.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.

10. Equity, Diversity, Inclusion and Decolonization (EDID):

Land Acknowledgement: We acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak, and Chonnonton Nations, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous peoples (First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors of our society. Throughout Canada, North America, and the world, Indigenous Peoples are vital contributors to their communities, and we greatly value their presence, knowledge, and wisdom.