

# Math 3152A-001 Course Outline (Fall 2023-24)

## *Combinatorial Mathematics*

### Course schedule, location, and delivery mode:

In-person: Mondays, Wednesdays and Fridays, 12:30-1:30 pm, in MC-108.

### Prerequisites:

A 0.5 course from Mathematics 2120A/B, Mathematics 2155F/G, Mathematics 2211A/B, Applied Mathematics 2811A/B, or the permission of the Department of Mathematics. *Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enrol 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.*

### Instructor information:

**Instructor:** David Riley, Professor of Mathematics

**Contact information:** [dmriley@uwo.ca](mailto:dmriley@uwo.ca), MC 136. I prefer to answer all simple questions by email. However, I will post in-person office hours on OWL soon. Remember: students *must* use their Western (@uwo.ca) email addresses for all University correspondence.

### Course materials:

**Textbook:** *A Walk Through Combinatorics*, either the 4<sup>th</sup> or 5<sup>th</sup> edition, by Miklós Bóna. The new 5<sup>th</sup> edition is supposed to be available in mid-September from the University bookstore. An ebook version is available online from the publisher: World Scientific.

**OWL statement:** Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

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. They can be contacted by phone at 519-661-3800 or ext. 83800.

**Technical requirements:** All assignments must be submitted using GradeScope.ca.

## Course syllabus (as time permits):

Enumeration, recursion and generating functions, linear programming, Latin squares, block designs, binary codes, groups of symmetries, orbits, and counting. Closely related topics and applications will also be discussed.

## Course-level learning outcomes:

- Students will be able to identify, formulate and solve problems in combinatorial mathematics, including proof writing.
- Students will be able to utilize combinatorial tools to model, analyze and solve problems arising in various areas of mathematics.
- Students will be able to present mathematical information, including proofs, in correct mathematical English.

## What is expected of the student:

Students should attend all classes, make a serious effort to understand all course material, and do all of the assigned work. The student must assume responsibility for any missed classes. It is up to the student to seek out help when needed. Students are expected to keep up with the material of the course by reading and learning definitions, theorems and results, and doing additional practice problems. They should review all learning materials in a timely fashion, follow class announcements, complete all assignments, and write all examinations. Solutions of collected homework problems must be written neatly and submitted using GradeScope.ca by the deadline. A fundamental component of the course is to *prove* mathematical theorems.

## Method of evaluation:

**Breakdown:** five assignments worth 5% each, one in-person Midterm Exam worth 30%, and one in-person Final Exam worth 45%. The Final Exam will be cumulative.

**Tentative due dates for assignments:** September 22, October 6, October 20, November 24, December 8.

**Tentative Midterm Exam date:** November 6 (in-class).

**Policies for assignments:** All assignments must be submitted using GradeScope.ca. *No late submissions will be accepted.*

## Student Absences:

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

**Assessments worth less than 10% of the overall course grade:** The only assessments worth less than 10% in this course are the individual assignments. If you miss one or more assignments during the course, for any reason, the corresponding 5% weight of each missed assignment will be added to the weight of your final exam component. Note, however, assignments are a fundamental component of the course, and so students are strongly recommended to submit all five assignments.

**Assessments worth more than 10% of the overall course grade:** 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://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf). The Student Medical Certificate is available at [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

If you miss the Midterm Exam and *accommodation is granted by your Academic Counselling Office*, the corresponding 30% weight of your missed Midterm Exam will be added to the weight of your Final Exam.

**Absences from Final Exam:** 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 Exam (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 Exam (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 Exam has been deferred. See the Academic Calendar for details (under Special Examinations).

## Contingency plan:

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly.

The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

## 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 are encouraged to contact Accessible Education, 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).

## Academic policies:

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

In accordance with policy, [https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](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.

**No electronic devices (computers, calculators, smart phones, smart watches, etc) will be allowed in any exam.**

**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 website: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

**In the event of a health lockdown**, tests and examinations in this course may 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>.

## 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](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](mailto: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](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/>.