Department of Mathematics & Statistics
Concordia University

MATH 480 (MAST 657/MAST 857), Sec. A

Geometry & Topology

Fall 2025

Instructor: Dr. A. Stancu
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Class Schedule: Mondays & Wednesdays, 10:15-11:30 am.

Midterm Break: No classes between October 11 and October 17, 2025.

Office Hours: Mondays, 3:00-4:30 pm.

Required Textbook: *Elementary Differential Geometry*, by A. Presley Springer (Second Edition) ISBN 978-1-84882-890-2 (softcover) or ISBN 978-1-84882-891-9 (e-book), available online as electronic resource at Concordia's library.

Undergraduate students willing to challenge themselves, and graduate students for whom this is a first differential geometry graduate course, should follow, in parallel to the class lectures, the course notes *An Introduction to Riemannian Geometry* by Sigmundur Gudmundsson at *Open Math Notes* of American Mathematical Society (AMS): https://www.ams.org/open-math-notes/omn-view-listing?listingId=110709

In addition, graduate students are directed to *Differential Geometry: Curves – Surfaces – Manifolds* by Wolfgang Kühnel (Second Edition) and, for some basics on topology of manifolds, *Geometry and Topology of manifolds: surfaces and beyond* by V. Munŏz et al. which is an e-book at Concordia's library.

Other material:

- *Differential geometry of curves and surfaces* by M.P. do Carmo
- *Differential geometry of curves and surfaces* by Kristopher Tapp
- *Differential geometry* by Theodore Shifrin (e-resource)
- *Riemannian geometry* by M.P. doCarmo (for MSc/PhD students)
- *Riemannian manifolds* by John M. Lee (for MSc/PhD students)

Topics: The following topics outline the content of the lectures: surfaces in three dimensions, the first and second fundamental forms of surfaces, curvatures of surfaces (principal, Gaussian, and mean curvature), geodesics, Gauss' Theorema Egregium, the Gauss-Bonnet theorem.

Graduate students will complement this content by guided independent study of Riemannian geometry on manifolds or other topics at the instructor's recommendation depending on individual mathematical interests, current background, and areas of study.

Final Grade: Homework 20%, Midterm Evaluation 30%, Final Evaluation 50%.
Undergraduate and graduate evaluations will differ in content.

The homework will be assigned approximately every two weeks, during class, and posted on Moodle. In case of a student's absence or late arrival, it is the student's responsibility to seek the assignment online and submit it on time. **No late assignments will be accepted.**

The midterm exam is scheduled for Wednesday, October 22nd, in class. Please be aware that a missed test cannot be made up.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

PLEASE NOTE: Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examination Office. Any conflicts or problems with the scheduling of the final exam must be reported directly to the Examination Office, **not** to your instructor. It is the Department's policy and the Examination Office's policy **that students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.**

Student Services
You may wish to access the many services available to you as a Concordia student. An overview of these resources can be found here: https://www.concordia.ca/students/services.html

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." *[Undergraduate Calendar, Sec 17.10.2]*

Behaviour
All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

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Extraordinary circumstances
In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.