

Information Sheet for Math 46100

Course: Math 46100, Differential Geometry, Spring 2025

Time: Mon/Wed 2–3:40 in NAC 1/511

Instructor: Prof. Cleary

Office: Marshak 301C **Phone:** 650-5122

Tentative Office Hours: Mondays 9:45am, Wednesdays 9:45am and 3:45pm, on days when classes meet. and by appointment. Check my webpage for the latest information about office hours.

Text: Pressley, **Elementary Differential Geometry**, ISBN: 184882890X, ISBN-13: 978-1848828902, Springer, 2nd edition, currently \$30.87 paperback at Amazon

Additional novel: E. Abbot Abbot, *Flatland*, free Project Gutenberg version, see webpage.

Software used: *Mathematica* obtainable for free via CUNY license

Prerequisite: a thorough knowledge of the topics of multivariate advanced calculus, Math 323/324, and linear algebra, Math 346.

Email: scleary@ccny.cuny.edu

Website: <https://profcleary.github.io/math6100>

The grading of your work during the semester will be as follows:

- **Homework (15%)**
- **Participation/Quizzes (15%)**
- **Exam 1: (15%):** Wednesday, March 5th
- **Exam 2: (20%):** Wednesday, Apr 9th
- **Final Exam: (35%):** Wednesday, May 21, 1:00pm–3:15pm

General Expectations: For each class hour spent in classroom lecture, I expect at least two hours spent outside of class reading and understanding notes from lecture, reading the book, and working on the homework. Math A6100 is a difficult class not only because the topics are challenging, but also because there are many topics. Furthermore, some of the topics are considerably more abstract than the topics in earlier courses and it will take more work and energy to understand them competently. I expect all students to attend all classes and attempt all the homework assignments.

Exam Policy: All exams are closed book unless specifically permitted otherwise. Notes, calculators and books will not be allowed. Campus photo ID will be required at all exams. There are **no** make-up exams. If you are going to miss an exam, it is your obligation to let me know as soon as reasonably possible beforehand. On the exams, it will be your obligation to demonstrate that you know how to solve the problems. The exams will consist of some problems similar to the homework and also some more difficult ones that will require some creativity to solve completely and efficiently. I will not expect every student to answer every

question completely correct, but I do expect students to know the material well enough to make reasonable progress even on difficult problems.

Homework Policy: Homework will be assigned in lecture each week and will be posted on the website for this class. The first homework will be collected on the Tuesday of the second week. Homework will be collected at the beginning of class. I expect students to arrive on time and turn in their homework at the beginning of class. Late homework will not be accepted. Because of this policy, the lowest two homework scores will not count. Since it is not feasible to grade all of the assigned homework problems, only a select few problems will be graded on each assignment. Your homework should be neatly stapled and clearly labelled with your name, the assignment number, and “Dr. Cleary”.

General Advice: This class will require a great deal of time because we will cover many topics over the course of the semester. Lectures, homework and quizzes will be an essential part of this class. If you do not have adequate time to devote to this class, please consider postponing this class until a semester in which you will have sufficient time. Remember the words of Dostoyevsky: “Originality and a feeling of one’s own dignity are achieved only through work and struggle.”

Academic Honesty: All work submitted for this course should be your own unless explicitly stated or acknowledged by you. If you collaborate with other students on the homework or use reference materials (online or hard copy) other than the texts, you must acknowledge the help. There is nothing bad about this, but if you work with other students on the homework you must mention their names and how they helped. If you find that you are not able to do the homework without consulting other students, you will have great difficulty on the exams, quizzes and with the participation components of the course. You are permitted to work with other students in the class, but this permission only applies to cooperative work, not to work done by one student and primarily copied by another.

Electronic and other assistance: Generative AI systems, online and computational tools such as Mathematica, Wolfram Alpha, and MATLAB, online problems solution banks, online answer forums, and tutors may not be used for any submitted work unless explicitly announced in advance as permissible. In the case that these are announced as permissible, such use must be acknowledged and documented. Assignments, exams and quizzes in the course are designed to be done by pencil and paper without supplemental materials.

Course Learning Outcomes

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|---|---------------|
| 1. understand and prove properties of curves in space | a,c,e1,e2,f,g |
| 2. understand and prove properties of surfaces in space | a,c,e1,e2,f,g |
| 3. understand fundamental notions for geodesics and curvature | e1,e2,f,g |
| 4. use mathematical software to model geometric relationships | a,d |

Course assessment tools

1. homework assignments, quizzes, participation
2. in-class exams
3. final exam

Departmental aims:

The mathematics department, in its varied courses, aims to teach students to:

- a. perform numeric and symbolic computations
- b. construct and apply symbolic and graphical representations of functions
- c. model real-life problems mathematically
- d use technology appropriately to analyze mathematical problems
- e. state (e1) and apply (e2) mathematical definitions and theorems
- f. prove fundamental theorems
- g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.