



MTH 434 - Fall 2021

Differential Geometry

Course Syllabus

Course information

Room: BH 429

Time: MW 6:00 - 7:50 pm

Credits: 3.0

Prerequisites: A grade of C or better in MTH 281 or MTH 283, MTH 286, and at least one mathematics course numbered 300 or above or departmental approval.

Description: This course introduces the study of smooth curves and surfaces using geometric reasoning and a combination of techniques from multivariable calculus and linear algebra. Topics will include parametrized curves and surfaces, curvature and torsion, first and second fundamental forms, Gaussian and mean curvatures, and geodesics. Other topics may be explored in class (time permitting) or in student projects.

Learning outcomes: Successful MTH 434 students will be able to:

- define and identify fundamental objects of differential geometry such as curves and surfaces;
- use appropriate techniques to analyze properties of smooth geometric objects;
- read and produce mathematical proofs using reasoning and tools of differential geometry.

Online resources: Visit Blackboard for up-to-date information about this course.

Instructor

Name: Federico Galetto (he/him/his; I/me/the instructor, in this document)

E-mail: f.galetto@csuohio.edu

Office: Rhodes Tower 1528

Virtual office hours: Schedule an appointment at <https://math.galetto.org/appt>

In-person office hours: Request an appointment via email

Materials

Notes and other materials will be distributed on Blackboard. All course materials are copyrighted and cannot be distributed without the permission of the authors.

The following textbooks will be used. Neither one is required. Digital copies of both textbooks can be downloaded from the CSU library at the links below (log in with your CSU credentials).

Suggested textbooks:

- Kristopher Tapp, *Differential Geometry of Curves and Surfaces*, Springer, hardcover: 978-3-319-39798-6, e-book: 978-3-319-39799-3, <https://scholar.csuohio.edu/record=b3436853>
- Andrew Pressley, *Elementary Differential Geometry*, Springer, softcover: 978-1-84882-890-2, e-book: 978-1-84882-891-9, <https://scholar.csuohio.edu/record=b2646577>

Grading

Grade calculation: All grades will be posted online. Your percentage grade will be computed according to the following breakdown and converted to a letter grade as indicated below.

40%	Homework	A	93%-105%	C+	77%-79%
30%	Projects	A-	90%-92%	C	70%-76%
30%	Tests	B+	87%-89%	D	60%-69%
100%	Total	B	83%-86%	F	0%-59%
		B-	80%-82%		

The instructor reserves the ability to revise this grading scheme but never in a way that would lower your grade.

Homework: You should expect one homework assignment per week. Assignments are delivered and collected on Blackboard. Please note that some homework problems may require the use of software (details will be provided in class).

The following criteria will be considered in the evaluation of your work.

- Completeness (answers are provided for all problems, reasoning behind answers is fully justified).
- Correctness (provided answers are correct, reasonings are sound).
- Insight (into the material showing deeper understanding of the subject).
- Quality of writing (writing is legible and clearly organized, has proper grammar and correct spelling, contains full sentences, uses mathematical notation correctly).
- Originality (answers and writing are not a mere copy or rewriting of other's work but show additional independent insight).

Projects: There will be two projects, one on curves and one on surfaces. Students will form groups of two or three, and will write a report on a topic assigned by the instructor. More details on the topics and the format of the reports will be provided in class. Each project will be worth 15% of the course grade. Projects will be evaluated using the same criteria listed for homework assignments.

Tests: There will be two in-class one-hour tests, one on curves and one on surfaces. More details on dates, topics, and format will be provided in class. Each test will be worth 15% of the course grade. There is no final exam. On the day designated by the registrar's office for the final exam:

- Wednesday, December 8, 2021, 6:00 - 8:00 pm,

you will be offered the opportunity to retake one or both tests in order to improve your grade.

Participation: Active participation is encouraged and can contribute positively to your grade. Such participation includes asking good questions during class, answering questions in class, contributing to class discussions and activities, etc.

Feedback: Feedback on your work will be provided using the comments and feedback tools on Blackboard. Turnaround time for grading will be communicated in class.

Grade appeal: You are responsible for checking feedback on your work, and for ensuring evaluations are reported correctly on Blackboard. Any appeal request must be submitted within one week after a grade is posted.

Policies

COVID-19 measures: The COVID-19 pandemic is still present and serious, especially with the Delta variant. While you are in class on campus, you are required to have a properly worn mask regardless of vaccination status, always cough or sneeze into your elbow or tissue, and adhere to other public safety protocols and directives for your specific classroom/lab/studio. Students who do not follow these health and safety requirements will be instructed to leave class immediately. If you violate this protocol, you will need to leave the classroom and may be marked absent. Repeated violations of these health-saving protocols may lead to sanctions under the Student Code of Conduct (3344-83-04 [E] and [Z]) up to and including suspension or expulsion. Students with medical conditions that prevent them from wearing a mask should register with the Office of Disability Services to explore reasonable accommodation options as soon as possible. To register with the office, please visit their webpage at: <https://www.csuohio.edu/disability/register>. The CSU community thanks you for your cooperation!

Communication: All communication, outside of class meetings, will be conducted via email. You can reach me at f.galetto@csuohio.edu. I strongly recommend using your CSU email account, as email from other accounts is often marked as spam. You can usually expect to receive an answer from me within 24 hours Monday through Friday, or within 48 hours during the weekends.

Attendance: You are expected to attend all classes. If you are unable to attend a class, it is your responsibility to notify your instructor in advance and to inquire about any topics covered and announcements made during that class.

Electronic devices: The use of electronic devices such as (but not limited to) phones, smartwatches, computers, tablets, and headphones is prohibited during class, unless otherwise required (e.g. to connect to a Zoom meeting) or indicated by the instructor.

Excused absences: You may only be excused from class and class related activities in case of university sanctioned activities (such as conferences, competitions, etc.) or in case of medical conditions. With the exception of unforeseen medical emergencies, you must notify your instructor of your absence and present sufficient documentation in advance. Sufficient documentation includes an invitation to attend an event or a doctor's note indicating you cannot attend on the scheduled date.

Extra credit and makeups: There is no extra credit in this class. There are no makeups in this class other than for excused absences. Insofar as circumstances allow, all makeups have to be arranged in advance.

Academic integrity: Cheating and/or plagiarism will not be tolerated. Cheating includes copying or receiving help from another student on quizzes, tests or exams, as well as allowing another student to copy from your work. Receiving help from someone else by using an electronic device such as a mobile phone or a smartwatch constitutes cheating. Copying another student's homework, or allowing someone else to do your homework for you, is also considered cheating. If cheating occurs in a quiz or test, the student will receive a grade of 0 for that component of the course. If a student cheats a second time during the course, the student will receive an F for the course. If cheating occurs on the final exam, the student will receive a grade of F in the course. Any cheating activity may be reported for further action. Information regarding the official CSU Policy on Academic Misconduct can be found at https://www.csuohio.edu/sites/default/files/3344-21-02_0.pdf.

Safe space: I am committed to making our encounters (in class, during office hours, in person, and online) feel safe for everyone involved. All participants are expected to conduct themselves in a respectful manner towards other participants and their ideas. Behaviors that are disrespectful or discriminatory towards other individuals or groups of individuals will not be tolerated.

Accommodations: Educational access is the provision of classroom accommodations, auxiliary aids and services to ensure equal educational opportunities for all students regardless of their disability. Students who feel they may need an accommodation based on the impact of a disability should contact the Office of Disability Services at 216-687-2015. The Office is located in BH 147. Accommodations need to be requested in advance and will not be granted retroactively.

Withdrawals: The last day to withdraw is Friday, October 29, 2021. Withdrawing from the course may put a student in violation of the federally mandated standards for academic progress (SAP) that a student must maintain to be eligible for financial aid. Please visit <https://www.csuohio.edu/financial-aid/standards-academic-progress-sap> for more information.

Course modifications: The instructor retains the right to modify the contents of the course, including grading criteria and course policies. Reasonable notice will be given for all time sensitive matters. Course changes will be communicated in class and on Blackboard.