MATH 435: VECTOR ANALYSIS AND INTRODUCTION TO DIFFERENTIAL GEOMETRY SPRING 2018 SYLLABUS

Disclaimer: This syllabus does not constitute a contract. The instructor reserves the right to make changes at his discretion throughout the semester.

General information:

- **Instructor:** Dr. Guillaume Dreyer
  Office: KAP 406K
  `Email: dreyfactor@gmail.com`
  Lectures: 2:00–2:50 am MWF in KAP 148
  Office hours: Monday, 3:00–5:00 pm; Wednesday, 3:00–4:00 pm. Location: KAP 263 (Math Center)
- **Teaching Assistant:** Dong Zhang
  Office: KAP 338B
  `Email: dongz@usc.edu`
  Office hours: TBA
- **Textbook:** Andrew Pressley, *Elementary Differential Geometry, Second Edition*, ISBN: 978-1848828902. The pdf file of the textbook is available for free on the USC Library website.
- **Prerequisites:** Math 226

Course content: Elements of vector analysis and applications to curves and surfaces, curvature of surfaces; 1st fundamental form; Gaussian, mean and principal curvature; geodesics; Gauss' Theorema Egregium, Gauss-Bonnet Theorem.

Learning objectives: Differential geometry is a topic at the intersection of multiple fundamental topics: multivariable calculus, differential equations, linear algebra, topology, real analysis, and of course geometry. It is a long journey that takes you everywhere. It requires patience, refection and naturally hard work. Ultimately, it helps to develop a better understanding of how different, powerful mathematical topics and methods come together to deliver some of the finest results in mathematics.

By the end of the semester, you will be familiar with the fundamentals of differential geometry in $\mathbb{R}^2$ and $\mathbb{R}^3$ and its applications to the study of curves and surfaces. Main objectives for this course are to cover Gauss' Theorema Egregium and Gauss-Bonnet Theorem. Before getting there, we will have to cover multiple concepts: curves, surfaces, advanced multivariable calculus, curvature, connection, geodesics, and some topology.

Blackboard: Weekly homework assignments as well as **grades** will be posted on **Blackboard** `http://blackboard.usc.edu`. It is everyone's responsibility to visit the website on a regular basis.

Grading breakdown: Homework 25%; 2 Midterm exams, 20% each; Final exam 35%.

Homework: Weekly homework will be posted on BB every Wednesday. **Assignment are due the following Wednesday in class at the beginning of our lecture**. Late and electronically submitted homework will not be accepted, no exceptions. You are allowed to drop one HW score. (Keep that one-time deal for that day you find yourself sick.)

You are strongly encouraged to discuss homework problems with your peers and to work in groups. This is the most efficient and rewarding way to learn and work. However, you must write your own solutions. **Homework which is simply copied from another source (friend, another textbook, internet, etc.) will be considered as plagiarism which is a serious offense to USC Student Code of Conduct.**

Exams: There will be two midterms and a final.

- **Midterm 1:** Wednesday, February 14th, in class.
- **Midterm 2:** Friday, March 30th, in class.
- **Final:** Monday, May 7th, 2:00–4:00 am. **You must take the final exam at the scheduled time.**

If there is a scheduling conflict for an exam, **you must let ME know (NOT the TA) at least 2 weeks before the examination**. A scheduling conflict must involve an activity sponsored and approved by USC (marching band, athlete event, etc.). In particular, the university club or organization in question must send an official request, with the Dean's approval, to all faculty. Personal activities do not qualify. **FAILURE TO ATTEND AN EXAMINATION WILL NOT BE EXCUSED UNDER NO CIRCUMSTANCES.**

No calculator, no cell/smart phone or other electronic device will be allowed during examinations.

I am your point of reference. Above all, what is covered during lectures – topics, methodology, examples, exercises and ways to solve them – are your points of reference. Failure to attend lectures is extremely likely to significantly impact your performance in this course.

Resources: The Math Center is located in KAP 263 and is open weekdays from 8 am to 7 pm (it closes earlier at 5 pm on Fridays). For up-to-date information on the consulting hours, visit the Math Center homepage `http://dornsife.usc.edu/mathcenter`. The purpose of the Math Center is to provide an environment where students can stop by to get help on their math classes. Math TAs at USC hold their office hours there. It is probably better to attend office hours of TAs who are teaching Math 126 this term. However, you are welcome to stop by the Math Center at any time and seek for help from any of the Instructors or TAs who are present at that time.

Students with disabilities: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester and a letter of verification detailing approved accommodations must be delivered to your Instructor as early in the semester as possible. DSP is located in STU 301 and is open 8:30–5:00 pm, Monday through Friday. The phone number for the DSP office is (213) 740–0776.