Math 120A: Differential Geometry

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Course Webpage: www.math.ucla.edu/~hendricks/Math120A.html Most course content can be found both here and on ccle. We will also use the my.ucla.edu gradebook for this class.

Location and Time: MWF 9-9:50 in Geology 4645. TA discussion section T 9-9:50 in Geology 4645.

Content: This course is an introduction to low-dimensional differential geometry. We will study the geometry of curves in two- and three-dimensional space, touching on curvature and torsion, the Frenet-Serret equations, and the isoperimetric inequality. We will next study surfaces embedded in three-dimensional space, covering the notion of a smooth atlas, various types of surfaces, the first and second fundamental forms, and the Gauss map.

Textbook: Pressley, *Elementary Differential Geometry.* Springer (1974). **Second Edition.** An electronic version of this textbook is available for free through the UCLA network; see the link on the course website.

We will make frequent use of an appendix of additional exercises published by Pressley, which are available on the course website and ccle.

You can also find a copy of *Classical Differential Geometry* by Peterson online; see the link on the course webpage. This may be a helpful supplemental resource.

Prerequisites: Math 115A, Math 131A.

Homework: Homework will be assigned weekly and due at the beginning of Friday's lecture. There will be nine homeworks. Do not submit homework by e-mail. **No late homework will be accepted.** However, your lowest homework score will be dropped when computing your grade.

You are encouraged to work in groups on your homework – this is generally beneficial to your understanding and helps you learn how to communicate clearly about mathematics. However, you must write up all solutions yourself. Moreover, since crediting your collaborators is an important element of academic ethics, you should write down with whom you worked at the top of each assignment. You must also cite any sources you use other than the lecture or the textbook (other textbooks, a blog about geometry, etc.)

Exams: There will be two in-class midterms on **Wednesday, October 29** and **Monday, November 24**. There will also be a final exam **Tuesday December 16, 3:00-6:00 p.m**. There will be not be any make-up exams except in extreme and documented circumstances. In particular, note that university policy

requires that a student who has an undocumented absence from the final exam be given a failing grade in the course.

Grading: Grades will be computed as follows:
- Homework: 20%
- Midterms 1 & 2: 20% each
- Final: 40%

A curve compatible with the department guidelines will be applied to the composite numerical grades. The average will be a B (unless something surprising happens).

Schedule: We will approximately follow the schedule of topics at http://www.math.ucla.edu/ugrad/courses/math/120A . (In fact the chapter numbers online are for a different textbook, but they correspond almost identically to our book.) This means we will cover most of Chapters 1-8. Exact reading will be posted as the quarter progresses.