

Math 4230: Geometry of Curves and Surfaces
Fall 2012

Class meetings: MWF 2:00-2:50 P.M. in ECCR 118

Instructor:

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MATH 321
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<http://math.colorado.edu/~jnc/2012Fall/Math4230/Math4230.html>

Office hours: Thurs. 11:00 A.M. - 1:00 P.M., or by appointment.

Prerequisites: MATH 2400 (Calculus III) and MATH 3130 (Linear Algebra) or the equivalent. Some experience writing proofs (such as MATH 2001) would be helpful, but is not required.

Text: J. Oprea, *Differential Geometry and Its Applications*, 2nd ed. (The Mathematical Association of America) 2007.

Course outline: This course will cover the classical theory of curves and surfaces in \mathbb{R}^3 . Topics will include:

- Curves: Frenet analysis of curves in \mathbb{R}^3 , including curvature, torsion, and their interpretations.
- Surfaces: smooth surfaces, tangent vectors, surface area, the Gauss mapping, Gauss and principal curvatures, mean curvature and minimal surfaces, isometric surfaces, geodesics, Gauss's Theorem Egregium and the Gauss-Bonnet theorem.

This material is covered in Chapters 1-6 of the text.

Grading: There will be a midterm and a final exam, both take-home, open book. Each exam will count for 25% of the final grade, and homework will account for the remaining 50%.

Homework: Homework assignments will be due approximately weekly. These assignments will consist mostly of problems from the text, as well as some occasional assignments involving the use of the computer algebra system Maple. You may obtain access to Maple in one of the following ways:

- Maple 16 is installed on the computers in the lab in MATH 217. The lab is open from 8:00 A.M. - 5:00 P.M., Monday through Friday. To request after-hours access via your Buff One card, go to <http://www.colorado.edu/its/labs/labaccess.html>.
- I will send out an email with a discount code which will allow you to purchase your own copy of Maple 16 for \$74.25 online at <http://webstore.maplesoft.com>. This is 25% off the usual student price of \$99, which in turn is about 1/20 of the regular (non-academic) price and 1/10 of the non-student academic price, so it's a VERY good deal, and I highly recommend it!

You are encouraged to work together on homework, although each student must submit an individual write-up. **LATE HOMEWORK WILL NOT BE ACCEPTED.**

Exams: The midterm and final exams will be take-home and open-book. You will be expected NOT to consult with other students or anyone other than me regarding the exams, and to sign the Honor Code pledge for each exam. (See information on the Honor Code below.)

Important Dates:

- **September 12 (Wed.):** Last day to drop a course without the instructor's signature (Exception: Students whose only college is Arts & Sciences have until November 2 to drop without approval signatures)
- **October 10 (Wed.):** Last day to drop a course without petitioning the dean (Exception: Students whose only college is Arts & Sciences have until November 2 to drop without approval signatures)

Accommodations for disabilities: If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with your professor.

Religious observances: Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See full details at http://www.colorado.edu/policies/fac_relig.html.

If you have any course-related conflicts due to religious obligations, please let me know as soon as possible so that accommodations can be made.

Honor Code: All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode/>.

Classroom behavior policy: Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code.

Discrimination and harassment policy: The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, or veteran status. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.