MATH2850 FALL 2012 SYLLABUS & GRADING
INSTR: DR.RAO NAGISETTY

Syllabus

We are going to cover roughly chapters 13—16 of the text: *Calculus 12th ed.* by Thomas

Chapter 13. We introduce the notion of a curve in space, better visualized as the path of a moving particle in space. It can also be described as a vector-valued function of time and derivatives of this function with respect to time are introduced for the purpose of describing the velocity and acceleration of a moving particle. On the way we investigate how the path bends and turns and in order to understand that we introduce the notions of curvature and torsion. Further we derive Kepler's laws using the Law of Gravitation due to Newton if time permits. To sum up by the end of this chapter we must understand the notion of a space curve, path of a moving particle, velocity and acceleration, rate of bending, rate of twisting. Also find the distance traveled which is the arc-length of a finite part of the curve. Tools:**differentiation, integration.** Notions:**Velocity, Acceleration, Arc-length, Curvature, Torsion.**

Chapter 14. In sections 1–3 we will introduce partial derivatives and in sections 4–5 establish the chain rule and define the gradient vector and directional derivatives. In section 6, we use these notions to calculate the tangent planes to surfaces. In sections 7–8 we develop tests to find extreme values and saddle points and also learn the technique of Lagrange multipliers to solve optimization problems. In the rest of the chapter, if time permits, we discuss the Taylor formula for functions of two variables and also compute partial derivatives with constrained variables.

Chapter 15. Sections 1–3 introduce double integrals and iterated integrals and explain how one could evaluate a double integral by identifying it with an iterated integral. Section 4 we apply a change of variable to polar coordinates, deal with computing integrals with the help of polar coordinates, e.g., areas of cardioids. Sections 5–8 triple integrals in various coordinate systems Cartesian, spherical, cylindrical. With the help of change of variables, we evaluate a few interesting volumes, centers of mass, moments of inertia.

Chapter 16. Sections 1–3 introduce vector fields and line integrals and notion of work done as a line integral. Section 4 connects line integrals with area integrals via Green's theorem. In section 5 we introduce the concepts of curl of a vector field, and divergence of a vector field. Sections 6–7 introduce surface integrals similar to line integrals. Sections 8–9 deal with two fundamental theorems namely, Stokes's and Gauss's one connecting a line integral with a surface integral and the other connecting a surface integral with the volume integral, both very important in mathematics and other sciences.

Grading

I plan to have 4 one-hour midterm tests before the Final. Midterm dates are Sept. 7th, Sept. 28th, Oct. 19th, and Nov. 9th. Questions on the quizzes and tests come from assigned exercises and examples done in class. Quizzes and Tests count for 70% and the Final Exam counts for 30% of your final grade. Grades are assigned as follows depending on your percentage: $A \geq 90 > A- \geq 85 > B+ \geq 80 > B \geq 75 > B- \geq 70 > C+ \geq 65 > C \geq 60 > C- \geq 55 > D+ \geq 50 > D \geq 45 > D- \geq 40$.

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e-mail:rnagise@math.utoledo.edu, hours: 11–12.30pm MTRF or by appt.

Suggested Problems.
In the list below first decimal number refers to chapter and section, pp stands for pages and the sequence of numbers after the colon refer to the numbers of problems.
13.1 pp 731–733: 3,46,7,9,12,14,17,18,21,22,23c,23d,24,25,27
13.2 pp 738–742: 2,4,6,8,13,15,22,23,26,28,29,31,44
13.3 pp 745–746: 3,5,7,9,12,13,15,18,19
13.4 pp 751–752: 2,4,6,10,13,18,19,21
13.5 pp 756–757: 1,4,6,7,9,12,20,23,26,27
13.6 Kepler's laws.
More to come later. Watch this site for future changes!