MAC 3473: Calculus III Honors

Description and Goals

Course Content: The course includes the following main topics: Vector algebra, Euclidean spaces, geometry of lines and planes in space, basic theory of quadratic surfaces, vector functions and curves in space, basic geometry of curves in space (tangent vector, curvature, and torsion), functions of several variables, limits and continuity, differentiability and partial derivatives, extreme values of a function of several variables, the method of Lagrange multipliers, Riemann integration theory, multiple and repeated integrals, transformations, Jacobian of transformation, change of variables in multiple integrals, integrals over curves and surfaces, improper multiple integrals, vector fields, conservative vector fields, line integrals of a vector field, flux of a vector field, Green's and Stokes' theorems, the divergence (Gauss-Ostrogradsky) theorem. All concepts of the course will be illustrated by real-life problems as a (historical) motivation for developing multivariable calculus.

Goals: Some key topics of the course, such as differentiability, integration theory and vector fields, will be studied more rigorously and deeper than in a regular Calculus 3 course. The aim is to prepare the students for upper division (advanced) mathematics classes. The students are also expected to read and analyze Study Problems in the textbook in addition to the material discussed during class meetings. The Study Problems are meant to facilitate a deeper understanding of the key concepts rather than teach technical tricks. Most concepts of the course are essential to understand mathematics used in advanced physics and engineering classes.

Placement Exam: There will be a placement exam (a new university policy for the Calculus 3 Honors course). The exam covers basic topics of UF Calculus 1 & 2 or their equivalents. It will be scheduled on one of the first three days of the first week of classes. The time and place will be announced in the first class meeting and posted in the course page. No make-up for the placement exam. Students who do not score high enough will be transferred into regular Calculus 3 sections. A total of 16 students will be selected for the honor sections. The results of the placement exam will be posted within a day after the exam. You may use two formula sheets on the placement exam. Calculators and any kind of electronic devices are NOT allowed. Here is the placement exam from Fall 2013 (with solutions).

Joker Problems

A: G>85; A-: G>80; B+: G>75; B: G>70; B-: G>65; C+: G>60; C: G>55; C-: G>50; D+: G>45; D: G>40; F: G<40

Grading:
Grading and Ranking
Grading: Each exam and each quiz is graded out of 100 pts. If an assignment contains N regular problem, then each problem is worth 100/N points (typically, N=8 or 9 for quizzes and exams, and N=12 for the final exam). There is a small partial credit for incomplete solutions, provided the proper concepts have been used in attempt to solve the problem. In your course grade G, the quiz average QA counts 30%, exam average EA counts 50%, final exam FE counts 20%

G = 0.3 QA + 0.5 EA + 0.2 FE

Here QA=[Q1+Q2+Q3+Q4]/4 is your quiz average and EA=[E1+E2+E3+E4]/4 is your exam average. The grade thresholds
A: G>85; A-: G>80; B+: G>75; B: G>70; B-: G>65; C+: G>60; C: G>55; C-: G>50; D+: G>45; D: G>40; F: G<40

Extra credit: One extra non-standard problem will be added to the exams and quizzes. If solved correctly, it adds 10-15 pts toward your assignment score, i.e. the perfect score can actually exceed 100 pts. Students who score above 90 in ALL written assignments during the semester (5 quizzes and 4 exams) may take either a take-home exam on Chapter 5 on the very last day of classes or the regular final exam (as scheduled). The time and place to turn in the take-home exam will be announced. The take-home exam score will be counted as the final exam score.

Ranking: The course score G will be used to rank students. The ranking may later be used by the department to evaluate mathematics honors students upon graduation or for admittance to graduate level mathematics courses.

Policies
Make-ups: Make-ups for any missed written assignment only with written medical excuse.

Class attendance: No credit for class attendance. You may leave or come any time without asking for a permission. However the class attendance is strongly recommended as some of the homework problems as well as sample problems for written assignments will be discussed in class. A brief description of each lecture will be posted in the homework page.

Special accommodation: Students requesting special accommodation for exams must first register with the Dean of Student Office. The Dean of Student Office will provide documentation to the student who must then provide this documentation to me when requesting accommodation.

Student honor code: Zero tolerance to any kind of cheating on written assignments. If caught cheating, the course grade is an F, no exception.