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MAC 3474, Calculus III Honors, Syllabus

Description and Goals

Course Text: S.V. Shabanov, Concepts in Calculus III (University Press of Florida, 2012). The latest edition of the textbook (2021) can be viewed here:

Textbook: S.V. Shabanov, Concepts in Calculus III

Course Content: The course includes the following main topics: Vector algebra, Euclidean spaces, geometry of lines and planes in space, basic theory of quadric 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.

Course format and goals: There are four in-person lectures per week. Attendance is not mandatory but highly recommended. Questions during lectures are encouraged. The objective is to reach crystal clarity on the aforementioned concepts. 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 to teach technical tricks. Most concepts of the course are essential to understand mathematics used in advanced physics and engineering classes.

Prerecorded lectures: Due to the pandemic, all lectures were recorded in the past and will be made available via the Canvas shell of the course as a supplementary material. Keep in mind that they can differ from the actual lectures. Yet, regular classroom discussions are more effective for learning than watching a “calculus soap opera” with one actor.

Enrollment limitations and merit: The course enrollment has a cap of 32 students. The UF enrollment system would not allow any enrollment after the section cap is reached. However the admission to this course is based strictly on merit which is verified by a placement test. ANY student (qualified for taking Calculus 3) can take the placement test and be admitted even if the student could not register for this course after the enrollment cap was reached. Out of all students who took the placement test, 20-25 top students will be selected for this section and the other will be transferred to regular calculus 3 sections. This will be done during the drop-add period. If you are not registered (or cannot register) for this section but willing to take the placement test, it is best to enroll into a regular section that meets at the same period. If you successfully pass the test, you will be transferred to this course section without any conflict in your schedule. The department will try resolve schedule conflicts that could arise upon transfers but the best way to avoid it is to enroll into a regular section such that there will be no schedule conflict whether you stay in it or get transferred to this course section.

Placement Test: There will be a placement test (a university policy for the Calculus 3 Honors course) to select students for this course. The test covers basic topics of UF Calculus 1 & 2 or their equivalents. It will be conducted either in the first or second day of classes in the evening hours (typically, 6-9 pm). Make sure that you don’t plan anything on these evenings. The actual date and time will be posted om **the course page** a few days before the semester starts. There is NO makeup for the placement test as the section must be formed within a day or so after the test. The exam will be open in the Canvas shell of the course and also posted in **the course page**. The exam is for 3.5 hours (this includes 30 minutes to prepare your submission). To prepare for the test, use Exercise Sections for Calculus 1 and 2 in a UF calculus textbook (in the previous years, many problems were taken from these sections). Do problems from the middle of those sections. Here is **the placement test for the class of 2020**. On the online placement test, you would have to work against the time to do as many problem as you can just like in a math competition. So, searching internet for solutions will be a waste of time. You cannot talk to anybody during the test, or discuss the test problems, or receive any help from any person. This will comprise your honesty pledge which you MUST sign. The goal of the placement exam is to select students who have a good working knowledge of the prerequisites of the course. The course is very intense and difficult to follow at a (necessary) steady pace without good knowledge and technical skills of Calculus 1 and 2.

Submission of the placement test: Students who are officially registered for the course should access and submit their work via Canvas. Canvas will generate a course shell before the start of the semester and you will see the placement test as your first assignment indicating the date and time when the test will be open. It will also show the due time. The system automatically rejects late submissions. Students who are not currently in this section have two options. Option 1: Send me an email asking to add your name to the Canvas shell (provide a UF ID number so that Canvas recognizes you as a UF student). Option 2: Download the test from the course page and submit your work by email (the link to the test will be activated shortly before the start time, refresh the page to see its latest version!). A late submission is determined by the submission time your email server registered. This is a free response test. Pick any problem from the test, mark its number, write your solution with ALL technical details clearly indicating how the final answer is obtained. Box the final answer. Do the same for as many problems as you know how to solve. Enumerate all pages as 1/n, 2/n, …, n/n where n is the total number of pages in your submission. At the bottom of the last page write and sign the academic honesty pledge (the text will be provided with the exam sheet). Scan your work into a single PDF file and name the file as LastNameFirstNamePT (where PT stands for Placement Test). Here are some useful Apps for scanning: CamScanner, Adobe Scan, Scanbot, Microsoft Office Lens, Evernote Scannable, Google Drive, TapScanner, PhotoScan, TurboScan among others. Make sure that you set a resolution of your scanner so that your submission is no more than 10 Megs (large submissions may have problems with uploading to Canvas or going through the UF email system). It is important that you practice this procedure before the test and see how much time you need to prepare your submission. Late submissions will NOT be accepted, especially on any “technical” excuse. Tests without signed the academic honesty pledge will NOT be accepted. If the Canvas page does not function properly during the submission, you may send your work by email (as the last option!). You can view your graded tests in Canvas within 1-2 days or receive them by email (if you are not in the Canvas shell of the course). Solutions will be posted in the course page. The scores and ranking will be posted in **the course grades and scores page.** You have to provide a web alias (fake) name in your submission under which your score will appear. Please do not use more than 6-7 characters.

Homework

Homework assignments will contain problems from the textbook. A brief description of each lecture and homework problems for it will be posted in the homework page. Homework is not turned in. A solution manual will also be posted in the course page. Doing homework (BEFORE consulting the manual) is essential for understanding the course and attaining a good grade.

Graded assignments

There will be 8 written assignments and the final. At least four of them will be conducted online in the same fashion as the placement test. Depending on the situation and regulations related to the pandemic, the others will be either in-person or online. The schedule will be posted in the second week of classes in the course page. All tests (online or in-person) will be conducted in the evening hours on a particular week day. The “test” week day will be decided in the second week of classes. For in-

person tests, you can have two formula sheets written by yourself. No electronic devices are allowed (calculators, phone, e-watches, laptops, etc). In-person tests will include problems assigned for homework. The course has 5 chapters, and each assignment is not cumulative and covers the material from the chapter under discussion (two assignments per chapter). The final exam is cumulative with an emphasis on Chapter 5 of the textbook.

Office Hours

Office hours will be conducted via Zoom. The schedule of and links to zoom Q&A sessions will be posted in the Canvas shell of the course. There will be one hour per week for in-person office hours. The schedule will be posted in the course page in the second week of classes.

Grading and Ranking

Grading: Assignments contains different numbers of problems of different levels of difficulty. A correct solution of a problem gives you one point. Your current score is

G=(M/N) 100%

where N is the total number of regular problem assigned and M is the total number of points gained. Gained points for each assignment will be posted in the grade page of the course under your web alias (fake name) so that you can compare your performance with the rest of the class. There is a small partial credit for incomplete solutions, provided the proper concepts have been used in attempt to solve the problem. One or two non-standard problems will be added to each assignment as extra credit. So, if you solve all regular problems and EC problems, the ratio M/N can exceed 1. The grade thresholds

A: G>90; A-: G>85; B+: G>80; B: G>75; B-: G>70; C+: G>65; C: G>60; C-: G>55; D+: G>50; D: G>45; D-: G>40; E: G<40

Special Final: Students whose score after 8 assignments exceeds 90 can take an online homework assignment devoted only to Chapter 5 instead of a regular final. The homework is posted on the last day of classes and is due in two days. Its score will be used for ranking as a regular final score.

Ranking: The course score G will be used to rank students. The ranking will later be used by the department to evaluate students for admittance to upper-level undergraduate and graduate level mathematics courses. Top students can count on a strong support in their academic careers.

Policies

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

Attendance: No credit for attendance of in-person lectures and Zoom Q&A sessions. However it is strongly recommended.

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.

Pandemic policies: Students are expected to comply with all UF policies related to the pandemic in all in-person classes.