Math 210 Calculus 3 - Syllabus, Spring 2017

CRN: 26315
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Office Hours: T 11-12, W 10-11, F 1-2
Class Meeting: MWF 3
Location: Taft Hall 316

TA: Mihail Hurmuzov
Discussion session meeting: T 1
Location: Addams Hall 302

Course Description
Math 210 is the third and the final part of our standard three-semester calculus sequence. The distinct feature of this part of the course is its focus on the multi-dimensional analysis, as opposed to one-dimensional analysis that you learned in Math 180 (Calculus I) and Math 181 (Calculus II). This semester you will learn such important concepts as a vector, a vector field, a function of several variables, partial derivative, a line integral and multivariable integrals. You will see that these concepts, as scary as they may sound, are actually a natural generalization of the things you already know from Calculus I and II. The ideas of the vector calculus apply to numerous areas of human knowledge such as engineering, physics, mathematics, biology, and many others.

Textbook
Calculus, Early Transcendentals, by W. Briggs and L. Cochran, second edition. We will only go through Chapters 11-14. This textbook has been in our use since 2014. Your instructor is not required to follow the text line-by-line or to use the same problems, so please take notes in class as well as read the textbook.

Course Structure
The class involves three hours of lectures on MWF, and one hour on T or R of problem solving session. Times and locations can be found at the beginning of this document.

Prerequisites
Grade of C or better in MATH 181. The prerequisite is enforced throughout all sections of the course without exceptions. Students that have not met the prerequisite will not be allowed to take the course.

Syllabus

WEEK	CONTENT	TOPICS
1	11.1, 11.2, 11.3	Discussion of course policies; vectors on plane; vectors in space. Distance, sphere, dot product, work of force.
2	Martin Luther King Day, 11.4, 11.5	Cross product, torque. Vector-valued functions. Parametric equation of a line; curves.
3	11.6, 11.7, 11.8	Calculus of vector-valued functions. Physical concepts of motion (velocity, acceleration, speed) using vector calculus; motion in a gravitational field*. Arc length in Cartesian and polar coordinates.

WEEK	CONTENT	TOPICS
4	12.1, 12.2	Planes, cylinders, quadratic surfaces. Functions of 2 variables, graphs, level curves; functions of 3 variables, level surfaces.
5	12.3, 12.4, 12.5, 12.6	Calculus of multivariable functions, limits, two-path test. Partial first and higher order derivatives, Clairaut Theorem, differentiability*. Chain Rule, implicit differentiation*. Gradient, directional derivative.
6	12.6 Review, 1st Midterm on 11.1-12.6; 12.7	Gradient, directional derivative, applications*; Review on Wednesday, 1st Midterm on Thursday; Tangent plane.
7	12.7, 12.8	Linear approximation, differential. Local extrema, critical points, 2nd derivative test. Absolute optimization.
8	12.9, 13.1	The method of Lagrange Multipliers, optimization problems, extreme distances. Double integral as a volume, over rectangles.
9	13.2, 13.3, 13.4	Double integrals over more general regions. Changing the order of integration, volumes of regions between 2 surfaces, area of a plane region using double integrals. Double integral in polar coordinates. Triple integrals, volumes and masses of solids.
10	13.5, Review, 2nd Midterm; 13.5, 13.6*	Triple integrals in cylindrical coordinates, emphasis on examples. Review on Wednesday, 2nd Midterm on Thursday; Triple integrals in spherical coordinates. Center of mass formulae*.
11	13.7, 14.1, 14.2	Plane transformations, Jacobian, change of variables on Friday. Vector fields, radial, gradient, potential. Line integrals of scalar functions; Integrals of fields, circulation, flux, work of force.
12	14.3, 14.4	Conservative fields, finding potentials, independence of path, FTC for those fields. Green's Theorem in the circulation form, finding areas using GT.
13	14.4, 14.5, 14.6	Green's Theorem in the flux form. Div and Curl in 3D. Surface integrals of scalar functions, surface area elements in spherical, cylindrical, and graph cases.
14	14.6, 14.7	Flux of a vector field through a surface, physical examples. Stokes' Theorem as a 3D analogue to 2D Green's Theorems in circulation form.
15	14.8, Review for the final	The Divergence Theorem as a 3D analogue to 2D Green's Theorem in flux form. Review for the final exam.
16	Final Exam	Cumulative Final on all covered sections will be given on the date to be announced.

Note: A topic marked by * may be covered briefly for one or more of the following reasons: it is similar to another one covered previously; it is of less importance for future development of the course material; it is relatively simple and may be given as a reading assignment; it is too advanced at the first reading. Please follow instructions in your class pertaining to these topics.

COURSE POLICIES

Attendance
Attendance of lectures and discussions is compulsory. A percentage of below 75% in lecture, or a percentage of below 75% in discussion will result in a drop of one letter grade for the course as a consequence. Below 50% attendance in either one of these categories will result in an automatic F for the course.

For example, if a student has a point total of 80% for the course, attended 90% of lectures but missed 4 discussions (which is more than 25% but less than 50% of discussions, starting form week 3), then the final grade of this student is a C.

Attendance in the course will be taken as follows (starting from week 3).

In lectures: Attendance in lectures is measured by random quizzes. A minimum of 12 short quizzes will be given during the semester. The quizzes will be unannounced, and given at the end of a lecture on randomly chosen days. In addition, your instructor may choose to take attendance at the beginning of randomly chosen lectures by means of an attendance sheet listing all the students registered in the class. The sheet will be circulated in the classroom, and every student present will be required to sign the rubric corresponding to her or his name. The attendance sheet will be returned to the instructor 15 minutes after the beginning of class.

Submission of a quiz sheet on behalf of another student or signing the rubric under the name of another student on any attendance sheet will be considered a serious violation of course policies. See the section on Academic Integrity Policy for details.

It is mandatory to attend at least 50% of lectures. Failure to do so without official waiver of attendance will lead to a grade of F for the course. Attendance of more than 50% but less than 75% of lectures results in a drop of one letter grade from the final grade.

In problem sessions: The TAs will take attendance in each problem session starting from week 3. It is mandatory to attend at least 50% of discussions. Failure to do so without an official waiver of attendance will lead to a grade of F for the course. Attendance of more than 50% but less than 75% of problem sessions results in a drop of one letter grade from the final grade.

Excused Absence Policy: Students that know ahead of time that they have an existing or potential conflict with the class must inform their instructor in the first two weeks of the semester using the appeal form available on the Blackboard site in the section Course Documents. Furthermore, students can appeal during week 9 and 10, as well as week 14 and 15 to their instructor using the appeals form. Note: no appeals will be accepted after the final exam!

Informing the instructor/TA about a planned absence does not automatically result in the absence being excused. In cases when the instructor cannot determine whether or not the reason is compelling and the absence may be excused, the instructor will forward the appeal to the Director of Undergraduate Studies, who will decide.

Methods of evaluation and grading policies
Your final grade in Math 210 will be determined by the number of points you earn on the following scale:

Grade	**Points**
A	points total => 85
B	70 <= points total < 85
C	55<= points total < 70
D	40<= points total < 55
F	points total < 40

The department reserves the right to lower the grading scale at the end of the semester. You can earn points as follows:

Up to 20	Midterm 1
Up to 20	Midterm 2
Up to 30	Final exam
Up to 15	Written Homework
Up to 5	Quizzes
Up to 10	MyMathLab Homework

Midterm grades: Although it is not MSCS policy to assign midterm grades to 200-level courses we will do our best to ensure that you receive a feedback of your performance before March 17. The midterm grades will follow the same cut-offs as for the final course grades, but with the following contributions:

35%	Homework
10%	Quizzes
15%	MyMathLab Homework
40%	Midterm 1

Tips on interpreting your midterm grade can be found at http://advising.uic.edu/student-tips-for-midterm-grades/.

Quizzes, homework, exams

Quizzes: The quizzes will be given during your regular lecture time on randomly chosen days. They will typically consist of one or two questions based on recent material with the purpose of keeping you involved and active in the lectures and letting you know if you are following the concepts. Grading scheme of a quiz is based on 0, 1, 2 points for each problem. It will be graded by the instructor, and returned in lecture or your problem session. There will be no make-up quizzes given, but only the highest 75% of quiz grades will be considered when computing the points corresponding to the quizzes on the final grade. Remember that quizzes will also be used for your attendance check.

Homework: Homework for the course is the same for all sections. There are two types of homework: online homework assigned in MyMathLab, and written homework assigned in Crowdmark. Both are mandatory and contribute to your final grade.

MyMathLab homework consists of a selection of problems for a particular section of the book. To receive full credit for an assignment for a particular section, you must complete the assignment by the end of day of the second lecture after the date when this section is listed in an online schedule. If you miss this deadline, you can still submit your MyMathLab assignment at a 25% penalty up till the day before the midterm, which includes this section. For the sections, covered after the second midterm, the final date for submitting MyMathLab assignments for 75% credit is the last day of classes.

To register for MyMathLab, please log into the Blackboard site for Math 210, and click the link MyMathLab on the left. You do not need a CourseID.

Some MyMathLab assignments contain Interactive Figures. To use Interactive Figures, you might need to download and install the Wolfram CDFPlayer (it is free to download for students). To find out what other software you need to install to work with MyMathLab, run a Browser Check: log into MyMathLab, and go to the Course Home. The link to the Browser Check is in the section `Welcome to MyMathLab'. Wolfram CDFPlayer is installed on the stationary computers in the library and in the computer labs on campus. You can use these computers to do your MyMathLab homework.

Written homework assignments will be assigned weekly by the course coordinator in the online system Crowdmark. These written problems will (generally) be more challenging than the MyMathLab homework problems and will require you to show your full work. The first written homework will be assigned on Wednesday of week 1 and due on Thursday of week 2. The deadlines for the subsequent homework assignments will be indicated on the homework. You will have to scan your solutions and submit them to the Crowdmark online system. The instructions on how to do that are available on the course webpage and in Blackboard in the section Course Documents.

We recommend that you do MyMathLab assignment before taking on the more involved written homework problems. Late homework can be submitted only with a written excuse document, for example a note from doctor, and no homework will be accepted after solutions are posted online. One lowest or missing written homework score and 3 lowest or missing MyMathLab homework scores will be dropped from your final grade at the end of the semester.

Exams: Two midterms will be given on Thursdays of weeks 6 and 10 of the semester, and one final on the week following the last week of classes. Midterm 1 will include Sections 11.1 - 11.8 and 12.1 - 12.6, Midterm 2 will

include 12.7 - 13.5 (only triple integrals in cylindrical coordinates in 13.5). The final exam is cumulative and includes material from the entire course. Updates on time schedules, room assignments and preparation materials can be found on the course webpage under the Exams link. Make-ups can be given to students that comply with the Excused Absence Policy above for the day of the exam.

Calculators
The use of any electronic devices with computing capabilities is prohibited during exams and quizzes.

Academic Integrity Policy
As an academic community, UIC is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community - students, staff, faculty, and administrators - share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students will be handled pursuant to the Student Disciplinary Policy: http://www.uic.edu/depts/dos/docs/Student%20Disciplinary%20Policy.pdf

Academic Deadlines
Current academic calendar and the list of deadlines can be found here:
http://www.uic.edu/ucat/catalog/CA.shtml#f

Disability Policy
The University of Illinois at Chicago is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at UIC. Students with disabilities who require accommodations for access to and/or participation in this course are welcome, but must be registered with the Disability Resource Center (DRC). You may contact DRC at 312-413-2183 (v) or 312-413-0123 (TTY) and consult the following: http://www.uic.edu/depts/oaa/disability_resources/faq/accommodations.html.

Religious Holidays
Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the student shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance. If the student feels aggrieved, he/she may request remedy through the campus grievance procedure.
http://oae.uic.edu/docs/ReligiousHolidaysFY20152017.pdf

Grievance Procedures
UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. Freedom from discrimination is a foundation for all decision making at UIC. Students are encouraged to study the University's "Nondiscrimination Statement". Students are also urged to read the document "Public Formal Grievance Procedures". Information on these policies and procedures is available on the University web pages of the Office of Access and Equity: www.uic.edu/depts/oae.