Course Syllabus MTH243: Calculus III (multi-variable) Spring2014

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Introduction

MTH 243, or Calculus III, is a third semester course in calculus. Its prerequisite is MTH142 or an equivalent Calculus II class. We will focus on functions of two, three, or more variables extending the ideas of elementary calculus to higher dimensions.

Objectives: At the conclusion of this semester you will be able to...

1. read and interpret 3d plots and 2d/3d contour diagrams, read and interpret tables of functions of several variables, and plot by hand the graph of simple functions of 2 variables, and simple contour plots of 2 or 3 variables.
2. do calculations with vectors that involve the concepts of addition, scalar multiplication, dot product, cross product, magnitude, projection, and use these concepts in geometry and physics applications.
3. calculate partial and directional derivatives, gradients and differentials of function of several variables, use local linearization to approximate functions,
4. calculate critical points, use the second derivative test to determine local extrema and saddle points (for functions of two variables only), use these concepts to solve unconstrained optimization problems, and use Lagrange multipliers to solve constrained optimization problems.
5. calculate double and triple integrals algebraically, change variables in integrals from rectangular coordinates to polar, cylindrical, spherical coordinates (and vice versa).
6. use the concept of parametrization to represent curves and surfaces
7. represent and interpret plots of vector fields (including flow lines)
8. use vector valued functions to do calculations of line integrals, flux integrals, divergence, and curl, apply these concepts and to problems in physics and geometry,
9. calculate flux integrals geometrically and algebraically over surface graphs.

Text

The text for the class is Multivariable Calculus, by McCallum, Hughes-Hallet, et. al. sixth edition, John Wiley & Sons Publishing. It is assumed that will you have access to the text by the second class meeting.

Sakai

SAKAI will be used in this class for all student/teacher electronic correspondence. Important class announcements, a grade book, submission of homework, and student/teacher messaging will all be done on SAKAI. If this is your first semester using SAKAI, get comfortable with it right away! Go to the URI main page and click on SAKAI and start poking around. Your SAKAI user name and password is the same as your URI email account.

Calculators

A graphing calculator is recommended (TI 83 or higher, or equivalent). Calculator use is allowed on all exams, quizzes, and homework assignments. Cell phone use is prohibited on all exams and all quizzes. Do not expect to use your cell phone (or tablet computer) as a calculator during exams.

Grading

Your grade will be based on three in-class exams, a comprehensive final exam, announced closed-book quizzes, unannounced open-notes quizzes, Mathematica assignments, and Wiley-Plus assignments. Minimum points for letter grades are shown below. There is no curve.

Grade	Minimum %
A	92
A-	90
B+	87
B	82
B-	80
C+	77
C	72
C-	70
D+	67
D	60
F	0

Component	Weight
Exam 1	13%
Exam 2	13%
Exam 3	13%
Mathematica	10%
Quizzes	10%
Wiley-Plus	15%
Final Exam	26%
Total	100%

Exams

Three exams plus a cumulative final will be given on the dates shown below. Exams are always closed-book. No questions will be taken during exams. You may have a calculator but never a cell phone on your desk during exams. Cell phones must always be off and out of sight during exams. Cell-phone interruptions during a exam will be penalized 5-points. Any visible electronic device, except a calculator, is a 5-point test score deduction. Cell-phone or computer use during a exam will be penalized 50 points. A missed exam requires prior notification and written documentation satisfying the instructor before any make-up is allowed. If a sanctioned make-up is not taken then the grade for the exam will be zero.

Quizzes

Quizzes will consist of announced and unannounced in-class assignments on recent material. Their purpose is to give you a head start on homework and to encourage regular attendance. There are never make-ups for missed quizzes; this would defeat their purpose. There will be an announced quiz nearly every Wednesday. A valid written excuse is required to be exempted from announced quizzes. A SAKAI message delivered to your instructor before class is enough to be exempted from unannounced quizzes..

WileyPlus

Part of your grade will be based on the online Wiley-Plus homework. This will be similar to MTH141 and 142. At least half of your learning happens here. These are time consuming and challenging problems chosen to get you ready for the exams. Wiley-Plus assignments will be due every Monday at 11:00pm. Late Wiley-plus is not accepted.

Mathematica

We will continue to use Mathematica in this course. The Mathematica software is available in the campus computer labs. A student version can be downloaded for free to URI students. Our work with Mathematica will be organized into Mathematica projects that you can download from SAKAI.

Attendance

Attendance is required. Unannounced quizzes and random attendance checks may be used to encourage attendance. If a quiz is unannounced it will be "open notebook." Students who need to miss a class should notify their instructor via SAKAI before the start of class on the day that they will miss. If students provide such prior notice via SAKAI, they will be exempt from penalty for missing unannounced quizzes and random attendance checks. Note: This exemption does NOT apply announced quizzes, or exams.

Honor code

If you are caught breaking the URI honor code, you could be given an F for the assignment or the entire class, or reported to the university for review and possible dismissal. As a student of higher standards, you pledge to embody the principles of academic integrity. You may work with other students on homework and Mathematica assignments as follows: You may discuss concepts, principles and methods with each other; however, you must prepare your own final submission separately. You are not to copy another student's work. Collaboration among students is not permitted during examinations.

Special accommodations

Students with special requirements and proper documentation through Disability Services should inform their instructor as early as possible. University regulations require that documentation be provided at least one week before special consideration is given.

Course outline

On the next page is a comprehensive course outline; use it to keep up with the reading, plan your studying, find your homework assignments, know when your exams are, etc. We will follow the schedule quite closely, but of course it is subject to possible minor editing in the case of typos, unforeseen events, weather anomalies, etc. The dates of the exams will not be changed unless URI cancels classes on those days.

Schedule for MTH243 Spring 2014

Class	Date	Section of Text/Topics	Practice for Quizzes	Events
1	W 1/22	12.1 Functions of two variables	#1-21 odd, 39,41	
2	F 1/24	12.2 Graphs of functions of two variables	#1-21 odd, 33,35	
3	M 1/27	12.3 Contour diagrams	#1-17 odd	
4	W 1/29	12.4 Linear functions (planes)	#1-15 odd, 21,23,25,33,37,39	**Quiz 1 (12.1-2)**
5	F 1/31	12.5 Functions of three variables	#1-15 odd	
6	M 2/3	13.1 Vectors, part I	#1-29 odd	**Wiley-plus due 11pm**
7	W 2/5	13.2 Vectors, part II	#1-9 odd	**Quiz 2 (12.3-5)**
8	F 2/7	13.3 The vector dot product	#1-25 odd	**Mathematica#1 due SAKAI**
9	M 2/10	13.4 The vector cross product	#1-19 odd	**Wiley-plus due 11pm**
10	W 2/12	14.1 The partial derivative	#1-15 odd	**Quiz 3 (13.1-3)**
11	F 2/14	14.2 Computing partial derivatives algebraically	#1-39 odd	
12	M 2/17	14.6 The chain rule	#1-15 odd	**Wiley-plus due 11pm**
13	**W 2/19**	**Exam I (covers sections 12.1-14.2)**		**Exam I (in class)**
14	F 2/21	14.3 Local Linearity	#1-15 odd	
15	M 2/24	14.4 Gradients and directional derivatives in 2D	#1-45 odd	**Wiley-plus due 11pm**
16	W 2/26	14.5 Gradients and directional derivatives in 3D	#1-43 odd	**Quiz 4b (14.6 & 14.3)**
17	F 2/28	14.7 Second order partial derivatives	#1-31 odd	
18	M 3/3	15.1 Local extrema	#1-19 odd	**Wiley-plus due 11pm**
19	W 3/5	15.3 Constrained optimization	#1-17 odd	**Quiz 5 (14.4, 5, 7)**
20	F 3/7	16.1 Definite integrals of functions of two variables	#1-5 odd	
21	M 3/17	16.2 Iterated Cartesian integrals (double)	#1-27 odd	**Wiley-plus due 11pm**
22	W 3/19	16.3 Iterated Cartesian integrals (triple)	#1-13 odd	**Quiz 6 (15.1, 15.3, 16.1)**
23	F 3/21	16.4 Double integrals in polar coordinates	#1-15 odd	
24	M 3/24	16.5 Integrals: cylindrical coordinates	#3,9,13,17	**Wiley-plus due 11pm**
25	W 3/26	16.5 Integrals: spherical coordinates	#1,5,7,11,15	**Quiz 7 (16.2-4)**
26	**F 3/28**	**Exam II (covers sections 14.3-16.4)**		**Exam II (in class)**
27	M 3/31	17.1 Parameterized curves	#1-41 odd	**Wiley-plus due 11pm**
28	W 4/2	17.2 Motion, velocity, and acceleration	#1-21 odd	**Quiz 8 (16.5)**
29	F 4/4	17.3 Vector fields	#1-21 odd	**Mathematica#2 due SAKAI**
30	M 4/7	18.1 The idea of a line integral	#1-21 odd	**Wiley-plus due 11pm**
31	W 4/9	18.2 Computing integrals over parameterized curves	#1-31 odd	**Quiz 9 (17.1-3)**
32	F 4/11	18.3 Gradient fields, path-independent fields	#1-25 odd	
33	M 4/14	18.4 Path dependent vector fields, Green's Theorem	#1-17 odd	**Wiley-plus due 11pm**
34	W 4/16	19.1 Flux Integrals	#1,5,9, … ,49 (every fourth prob)	**Quiz 10 (18.1-18.3)**
35	F 4/18	19.2 Flux Integrals of graphs	#1-29 odd	
36	M 4/21	19.3 Divergence of a vector field	#1-13 odd	**Wiley-plus due 11pm**
37	W 4/23	19.4 The Divergence Theorem, Flux density	#1-11 odd	**Quiz 11 (18.4, 19.1-2)**
38	**F 4/25**	**Exam III (covers sections 16.5-19.2)**		**Exam III (in class)**
39	M 4/28	Review		**Wiley-plus due 11pm**
*	**TBA**	**Final Exam (cumulative, ch12-20)**		**Final Exam (in class)**