Syllabus for MATH 2321, Calculus 3 for Science and Engineering (Honors), Section 19

Northeastern University, Fall 2018

Instructor: Dr. Neranga Fernando

Office: 530 Nightingale

E-mail: w.fernando@northeastern.edu

Office hours: Wednesdays 6pm – 9pm

Meeting times and location: MWR, 9.15am – 10.20am at Shillllman Hall 425.

Textbook: *Worldwide Multivariable Calculus,* by David B. Massey

PDF and printed versions available at: http://www.centerofmath.org/textbooks/multicalc/index.html

The PDF is priced at $9.95, while the black and white (grayscale) soft-back printed version is $29.95. The PDF textbook contains a link, at the beginning of each section, to one or more free video lectures, by Prof. Massey, on the contents of that section. The PDF has hyperlinked Tables of Contents, Indices, and cross-references; you may need to activate the Forward and Back buttons in your PDF viewer to take full advantage of the hyperlinks. To use the textbook on an iPad, we recommend the free Adobe Reader app.

It is absolutely **NOT** required that you purchase a printed textbook.

Web materials: All class announcements, material, and grades will be posted on Blackboard.

Homework: Homework will NOT be collected. It is strongly advised that you do all of assigned homework since the tests will closely resemble the homework problems.

Tests and final exam:

There will be five tests, and a cumulative final exam in this course. The tests are 65-minute in-class tests. There will be NO make-up tests.

Date, time and location of the final exam are to be determined. **Check for exam schedule conflicts as soon as possible**. Only two finals at the same time or three in one day is a University recognized legitimate reason to be excused from taking the final at the scheduled time. Students with such a conflict should complete a final exam conflict form, available on the registrar's website.

Snow days: If classes are cancelled due to snow, or for other official reasons, any scheduled quiz or test will occur on the next class meeting.

Grading: The course grade will be determined as follows:
Final exam: 40%
Tests: 60% (12% each)

Letter grades are determined numerically:

$A \geq 93$, $92 \geq A- \geq 90$, $89 \geq B+ \geq 87$, $86 \geq B \geq 83$, $82 \geq B- \geq 80$,
$79 \geq C+ \geq 77$, $76 \geq C \geq 73$, $72 \geq C- \geq 70$, $69 \geq D+ \geq 67$, $66 \geq D \geq 63$,
$62 \geq D- \geq 60$, $F \leq 59$

The grade I (Incomplete) will be given only if you have a good attendance record, have missed the final exam for a good reason, and otherwise are doing passing work. An incomplete is given at the discretion of the instructor.

Additional resources:

Course TA information and their office hours:

Brian Hepler

Recitation meetings:

These are optional sessions to help with homework or other questions.

Wednesdays, 1.50pm – 3.30pm, 119 Hastings Hall

The Mathematics Department Tutoring Center is in Room 540B, Nightingale Hall. This peer tutoring is free. Peer Tutoring appointments can be booked via MyNEU under TUTORING. Although you can walk in, it is really best to sign up in advance. Tutoring requests are scheduled by students in real-time and confirmed by email. Next-day appointments must be booked by 9:00 pm the previous day. It is expected that tutoring services in the Mathematics Department Tutoring Center will begin shortly after the start of classes. See http://www.northeastern.edu/csastutoring/setting-up-appointments/ For more information about peer tutoring.

The College of Engineering also provides tutoring for Calculus. See http://www.coe.neu.edu/undergraduate-support/tutoring for details.

The PDF textbook contains links at the beginning of each section to online full-length, free, video lectures on the contents of that section. These videos can also be accessed directly by going to: http://www.centerofmath.org/videos/index.html#subject5 . If there is a discrepancy between how the videos present material and how your instructor presents material, you should follow your instructor's presentation, but you should discuss the matter with your instructor.

Issues with the course/instructor: If you have issues with this course and/or instructor which you are not comfortable discussing with your instructor, you should first contact the Course Coordinator, Prof. Prasanth George, at p.george@northeastern.edu. If you prefer, you may contact the Teaching Director, Prof. Robert McOwen, at r.mcowen@northeastern.edu .

Academic Honesty: Collaboration on quizzes, tests and final exam is not allowed. From Student Code of Conduct (see http://www.northeastern.edu/osccr/academicintegrity): "A necessary prerequisite to the attainment of the goals of the University is maintaining complete honesty in all academic work. Students are expected to present as their own only that which is clearly their own work in tests and in any material submitted for credit. Students may not assist others in presenting work that is not their own. ... Offenders are subject to disciplinary action." For more on Academic Integrity see: http://www.northeastern.edu/registrar/courses/cat1213-univ-proc.pdf

Note the following dates:

Tuesday, September 18: last day to elect pass/fail for Fall-18 classes
Tuesday, September 25: last day to withdraw without a W
Friday, September 28: last day to file a final exam conflict form
Thursday, December 6: last day to withdraw with a W

Important:

1) Any student with a disability is encouraged to meet with the instructor during the first week of classes to discuss accommodations. The student must bring a current Memorandum of Accommodations from the Disability Resource Center (DRC).

2) If you are an athlete and have conflicts with an important class activity (quiz, mid-term, or final), you should let your instructor know before the end of second week of classes. You should also bring an official letter from the Office of Athletics.

3) All electronic devices (mobile phones, laptops etc.) should be turned off during class time, quizzes, tests and final exam.

Syllabus: Syllabus is subject to change**.** It is your responsibility to be aware of any changes the instructor may make to the syllabus as they are announced in class. Students are responsible for all information given when they are absent.

TRACE: Please complete the TRACE evaluations at the end of the course.

Schedule of Topics and Suggested Homework Exercises

Week 1 (partial): Sept. 5-7

Review §1.2   R^n as a vector space   #1,   3, 5, 7, 9, 10, 13-16, 19-21, 23-24, 27, 29, 33, 36, 41-43, 45, 46   + §1.3 Dot product, angles, and orthogonal projection   #1-4, 9-12, 17-19, 22, 23, 27-30, 33-35, 45-48

Review §1.4 Lines, planes, and hyperplanes   #1-4, 9-12, 13-17, 19, 21-23, 27-30

Week 2: Sept. 10-14

Review §1.5 Cross product   #1-4, 9-12, 17-20, 27-29, 31, 35, 37, 41

Review §1.6 Functions of a single variable   #1, 4, 5, 7, 9, 10, 18, 19, 21-25, 29, 33-35

§1.7 Multivariable functions   #1, 2, 4, 7-10, 15, 17-19, 21, 27, 28   + §1.8 Graphing surfaces   #1-10, 11-15, 19, 20, 23, 25

Week 3: Sept. 17-21

§2.1 Partial derivatives   #1, 2, 5, 7, 13, 16, 18, 19, 22, 27, 29, 32, 34

§2.3 Linear approximation, tangent planes, and the differential   #1, 3, 5, 6, 11, 12, 15, 17, 22, 23

Test 1- Thursday, September 20

Week 4: Sept. 24-28

§2.4 Differentiation rules   #1-4, 8, 19, 20, 23, 25, 27, 31, 32

§2.5 Directional derivatives   #1, 3, 5-7, 11-13, 19-21, 25-27, 33-35, 37

§2.7 Level sets and gradient vectors   #1-3, 7-13, 17, 18, 21, 24

Week 5: Oct. 1-5

§2.8 Parameterizing surfaces   #1-3, 5, 9-11, 17-19, 21, 29, 30

§2.9 Local extrema   #1-6, 9-14, 17-20, 35

Test 2- Thursday, October 4

Week 6 (partial): Oct. 9-12

Monday, Oct. 8: Columbus Day - no classes

§2.10 Optimization   #1, 2, 7, 8, 9, 10, 13, 17, 19, 20

§2.11 Lagrange multipliers #1, 3, 12, 13, 15, 19, 23, 27, 29

Week 7: Oct. 15-19

§3.1 Iterated integrals   #1, 3, 4, 5, 9, 16, 17-24,   27, 28

§3.2 Integration in R^2   #1-3, 6-8, 17, 18, 23, 24, 27-29, 31-33

§3.3 Polar coordinates #1-7, 17

§3.4 Integration in R^3 and R^n   #1, 3, 6, 7, 9, 11, 13, 14, 16-18, 20

Week 8: Oct. 22-26

§3.5 Volume   #1-3, 9-11, 17, 18

Test 3- Thursday, October 25

Week 9: Oct.   29-Nov. 2

§3.6 Cylindrical and spherical coordinates   #1-3, 7-9, 13-15, 19-21, 25-27, 31, 32, 35, 36

§3.8 Density and mass   #1, 2, 7-10

§3.11 Surfaces and area   #1-3, 9, 11-13, 15-17, 19-21

Week 10: Nov. 5-9

§4.1 Vector fields   #1, 3, 7, 8-14, 17, 18, 21, 22, 26-28

§4.2 Line integrals   #1-3, 7, 8, 15, 16, 18-20, 23, 25, 27

Test 4- Thursday, November 8

Week 11: Nov. 12-16

§4.3 Conservative vector fields   #1-3, 7-9, 15-17, 23, 24, 27, 33, 35, 41, 43

§4.4 Green's Theorem   #1, 3, 5, 7-9, 13, 15

§4.5 Flux through a surface   #1, 2, 7, 9, 10, 11, 15, 19, 20

Week 12 (partial): Nov. 19-20

§4.6 The Divergence Theorem   #1-4, 6-11

Wednesday, Nov. 21-23: Thanksgiving break - no classes

Week 13: Nov. 26 - 30

§4.7 Stokes' Theorem   #1, 2, 5, 6, 9, 10, 17

Test 5- Thursday, November 29

Week 14 (partial): Dec. 3-5

Review

Thursday, Dec. 6: reading day
Final Exams: Dec. 7, Dec. 10-14