Syllabus for MATH 2321, Calculus 3 for Science and Engineering

Northeastern University, Spring 2020

Class: 1:35 pm - 2:40 pm MWR,   Snell Library 017,   Section 4 – course no. 30631

INSTRUCTOR: **He Wang.**   Office: **LA571**   E-mail: he.wang@northeastern.edu

OFFICE HOURS: 12:15-1:15pm Monday, Wednesday, Thursday and other times by appointment.

Math Dept. Office: LA567. phone 617-373-2450

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 $19.95, while the black and white (grayscale) soft-back printed version is $39.95. 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.

Other free online materials for intuitions of geometry: www.wolframalpha.com/, www.geogebra.org/, YouTube: 3blue1brown, etc.

HOMEWORK AND QUIZZES: see schedule (Most quizzes and midterms will be on Thursdays.)

MIDST-TERMS AND FINAL EXAMS: see schedule

The final exam date is to be determined. **Check for exam schedule conflicts before Jan 29**.

SNOW DAYS: If classes are cancelled due to snow, or for other official reasons, any scheduled quiz or midst-term exam will occur on the next class meeting.

GRADING: The course grade will be determined as follows:

Quizzes 30%   Midterms 30%   Final exam: 40%

COURSE TA : To be Determined

TA's office Hours: To be Determined

RECITATION SESSION:

This is an optional session to help with **homework** or other questions.

Tuesdays, 3:35-5:05pm in Ryder 154

ADDITIONAL RESOURCES:

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: p.george@northeastern.edu   For things remain unresolved, you may contact the Teaching Director, Prof. Robert McOwen: r.mcowen@northeastern.edu

Tentative Schedule of Topics and Suggested Homework Exercises

Week 1 : Jan. 6-10

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
Review   §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: Jan. 13-18

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
Quiz 1.

Week 3 (Partial): Jan. 20-24

§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

Week 4: Jan. 27-31

§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
Quiz 2.

Monday, Jan 27: last day to withdraw without a W
Wednesday, Jan 29: last day to file a final exam conflict form

Week 5: Feb. 3-7
§2.7 Level sets and gradient vectors   #1-3, 7-13, 17, 18, 21, 24
§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
Quiz 3.

Week 6 : Feb. 10-14

§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
Review
Midterm Test 1- Thursday, Feb 13

Week 7 (Partial): Feb. 17-21

§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

Week 8: Feb 24-28

§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
§3.5 Volume   #1-3, 9-11, 17, 18
Quiz 4.

March 2- March 6 Spring Break (No classes)

Week 9: Mar. 9- 13
§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: Mar. 16-20

§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
Review
Midterm Test 2 - Thursday, Mar 19

Week 11: Mar. 23-27

§4.3 Conservative vector fields (1st day) #1-3, 7-9, 15-17, 23, 24, 27, 33, 35, 41, 43
§4.3 Conservative vector fields (2nd day) #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
Quiz 5.

Week 12 : Mar. 30- Apr. 3

§4.5 Flux through a surface   #1, 2, 7, 9, 10, 11, 15, 19, 20
§4.6 The Divergence Theorem   #1-4, 6-11
Quiz 6.

Week 13: Apr. 6 - 10

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

Week 14 (partial): Apr. 13-17

Review, Course evaluations etc (Note: Tuesday April 14 is the last day of Spring 2020 classes).

Wednesday, April 15: last day to withdraw with a W
Wednesday, April 15: reading day
Final Exams: April 16,17 and April 21-24
(Monday April 20 is Patriot's Day- Holiday)