

MATH U142 Spring 2008 - Syllabus (Professor Egon Schulte)

Meeting Times: MWT 10:30-11:35, 155 Ryder Hall (Key #12531)

Instructor: Egon Schulte, 496 Lake Hall, 617-373-5511, schulte@neu.edu

Office hours: M 9:15-10:20, W 1:35-2:40, Th 9:15-10:20, and by appointment.

Website: <http://www.math.neu.edu/~schulte/courses.html>
Contains the syllabus and the test schedule.

Text: R.N.Greenwell, N.P.Ritchey and M.L.Lial, Calculus for the Life Sciences (2003).

Prerequisites: Math U141 or equivalent calculus preparation, including antiderivatives.

Course Content:

- Integral calculus and its applications.
- Multivariable calculus: partial derivatives, extremal values, tangent planes, multiple integrals, applications to probability.
- Differential equations: Euler's method, separable equations, systems of two equations.

Students completing the course should be able to recognize and use the concepts and methods of calculus when they occur in their disciplines.

Grading: There will be nine 25-minute Tests counting 60% in all. Your lowest Test score will be dropped, so only the highest eight scores count. There are no make-ups. The two-hour Final Exam will count 40%, or 50% if it helps your grade (in this case the Test scores are counted proportionally).

Final Exam: All students without legitimate conflicts must take the final exam at the scheduled time. Contact the Registrar in the first two weeks of classes if you have a time conflict or three finals in one day.

Attendance Policy: Your regular attendance is expected. It is your responsibility to know assignments and other class information including any changes to the syllabus the instructor may make as they are announced in class. Students are responsible to know about all information given, even when they are absent. Feel free to use e-mail to ask me.

To talk to someone else: If you have a concern about the course or the instructor that cannot be resolved by speaking to the instructor, the next step is to speak with the Undergraduate Director, Professor Martsinkovsky (471 Lake Hall, x5510, alexmart@neu.edu).

Tutoring: Free tutoring is available to all students at the Mathematics Tutorial Center, 540B Nightingale (x2328). All tutoring is done on a first come first served basis. Students must come in person to schedule appointments. Tutoring begins mid January.

Academic Honesty from Student Code of Conduct: see
<http://www.northeastern.edu/osccr/academichonesty.html>

"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."

Changing grades, Incompletes: It is University policy that no grade, including an Incomplete, may be changed after one year. Exceptions must be authorized by the Academic Standing Committee. Note that an "Incomplete" grade request requires a written understanding (contract) between the Instructor and student with details about what material will be made up and how. They are normally appropriate only for a student who is doing well, but becomes ill, or has a family emergency late in the semester.

TOPICS AND ASSIGNMENTS

6. Differentiation and linear approximation

6.3. Implicit differentiation: p. 347 # 1-9 odd, 19-23, 35, 41-44.

6.4. Related rates: p. 353 # 1-3, 9-13, 23-25, 28, 32-33.

6.5. Differentials, linear approximation: p. 361 # 1-8, 11, 12, 19-26.

7. Integration

7.1. Antiderivatives (review): p. 378 #1-4,5-30,45-48,51-56.

7.2. Substitution method: p.387, #2-34,36,38.

7.3. Area and the definite integral (Riemann sums): p. 397, #1,3-5,6-22,23-26,29- 36.

7.4. Fundamental Theorem of Calculus: p. 409 #1-23, 31-33,41-44,46,51-52.
p. 411 #53-62,64-67.

7.5. Integrals of Trig Functions: p. 418 #1-15, 25-27, 31-33,35.

7.6. Area between two curves: p. 424 #1-9,22-25,27,29-30,35-36.

7. Summary: p.428 #19-28,31-33,41-48,58-61,63-65,67-71,73-79
Extended Application: p. 433-435 #1-4.

8. Techniques of integration, application to volume, flow and amount

8.1. Numerical integration, trapezoid, Simpson's rules: p. 443 #1,5-7,13-16,17-20,
p. 445 #23-35.

8.2. Integration by parts (lightly): p. 454 #1-11 odd, 21,23,35, 40-44.

8.3. Volume and average value: p. 461 #1-9,18-22,24,26-29,36,38-40.

8.4. Improper Integrals (infinite domain): p. 467 #1-8,27-30,31-33,37-38,44-47.

8. Summary: p. 469 #6-9,11-15,27-29,33-40,43-44,45-49.
Extended Application: p. 472-474. Ex 1-3.

9. Multivariable Calculus

- 9.1. Functions of several variables. p. 485, #1-2,6-7,14-17,22-27,28, 32-37,39-44.
- 9.2. Partial Derivatives: p. 495 #3-8,18-25,35-38,39-42, 45,47-60,63-64,66.
- 9.3. Maxima and Minima: p. 506 #1-8, 21-23. 32-33.
- 9.4. Total differentials and approximations: p. 512 #1-3,9-11,15-24.
- 9.5. Double integrals: p. 524 #1-7, 13-17, 23-26,33-38, 41-44, 53-55. 64-65,68-69.
- 9. Summary: p. 527 #2-6,14-18,26-27,34-37,42,45-48,51-53,57-60, 63-69,73-77.
Extended Application: p. 531-532.

11. Differential Equations

- 11.1. Elementary and Separable Equations: p. 611 #1-15,19-23,27-28,33,38-42,52.
- 11.2. Linear first order DE: p. 621 #1-7,15-17,23-25,31,34-35,
- 11.3. Euler's method: p. 628 #1-5,11-14,21,25,29,30-36.
- 11.6. Applications of DE: p. 650 #1-16
- 11. Summary: p. 652 #5-12,13-20,25-27,33,38,43-46, 47-52,59-61.
Extended Application: p. 656-657, #1-6.

13. Probability density functions

- 13.1. Continuous Probability: p. 735 #1-7,11-13,23-25,27-30,32-35,37-39.
- 13.2. Expected values and variance: p. 744 #1-5,9-10,11-13,15-16, 21-32.
- 13.3. Special density functions – exponential, normal distributions:
p. 756 #1- 8,11-14,27-38.
- 13. Summary : p. 760 #2-23, 33-38,40-41.
Extended Application: p. 765-767, #1-6.

10/11. Systems (optional)

- 10.1*-10.4* Introduction to systems of two linear equations, matrices.
- 10.5* Eigenvalues/eigenvectors of 2x2 matrices p. 593 #1-3,14,19-21.
- 11.4* Linear systems of DE p. 637 # 1-4,9,15
- 11.5* Nonlinear systems of DE, phase diagrams: p. 644 #1-8,9-14.