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Department of Mathematical Sciences  
ELIZABETHTOWN COLLEGE

Office hours: Mo, We, Fr 2:00 – 3:30pm;  
Tu, Th 12:30 – 2:00pm.

Instructor: Bogdan Doytchinov  
Office: E384C  
phone: (717)361-1224  
e-mail: doytchinovb@etown.edu

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web page for the course: <http://users.etown.edu/d/doytchinovb/ma121/>

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## SYLLABUS

**TEXT:** James Stewart, *Calculus. Early Transcendentals*, 7th ed., Cengage Learning Brooks/Cole Publishers, ISBN 978-0-538-49790-9 (or the cheaper loose-leaf edition, ISBN 978-0-8400-5885-0).

**PREREQUISITES.** Placement.

**CALCULATOR.** A calculator is not required for this class and will not be allowed on any quizzes, tests, or exams. You are welcome to use your calculator as you study at home, to illustrate and illuminate some of the concepts studied; however, be aware that your skills will be tested based on what you can do without a calculator. No electronic devices (calculators, mp3 players, smartphones, etc.) can be used in class. Cell phones should be turned off or on vibration and should be put away.

**COURSE GOALS and COVERAGE.** This is a first course in Calculus. It is intended to give you a thorough introduction to the basic concepts and techniques of the differential and integral calculus of elementary functions, including a study of limits and continuity. It will give you a working proficiency in important Calculus techniques that find application in future courses and directly in your line of work. Applications to the physical, biological and social sciences will be studied throughout the semester.

We will introduce some transcendental functions (like the exponential, logarithmic, and the inverse trig functions), investigate limits and continuity, develop some techniques of differentiation and integration, and use Calculus to model phenomena. We will cover Chapters 1 to 5 of the text, omitting some sections, but revisiting some of the appendices as a refresher of necessary skills (see the attached schedule for more details).

**STUDENT LEARNING OUTCOMES.** By the end of the semester you will be able to:

- model real-world phenomena using algebraic and transcendental functions;
- compute limits and interpret their meaning in different contexts;
- identify continuity and discontinuity properties in functions that you encounter;
- compute derivatives and interpret them as rates of change;
- set up and compute integrals;
- use inductive or deductive reasoning to formulate and evaluate arguments;
- use calculus techniques to model real-world phenomena;
- use calculus effectively in problem-solving strategies.

**ASSESSMENT.** Your final grade for the course will be based on the degree of mastery of the learning outcomes listed above, as measured by performance in class, and on quizzes, online assignments, tests, and the final exam.

**LECTURES.** This is a 4-credit course. You are supposed to spend 12 hours per week on this course. Of these, you will be spending 4 hours per week in class, in four 60-minute lectures. The other 8 hours must be devoted to studying on your own: reading the book, completing the online assignments, reading and organizing your notes, solving problems.

You are expected to attend all lectures. If you miss a class, it is your responsibility to make a copy of the classnotes from another student and make sure you learn what you have missed. Excessive absences may result in a lower grade.

## BASIC SKILLS (Fundamental Elements)

In order to receive a grade of C- or better in this class, you must demonstrate mastery of Fundamental Elements by scoring at least 80% on each of the following five online assignments:

- **FE2** Solving equations (linear, quadratic, and others), the factor theorem and long division, and completing the square. For the most part, these topics are covered in Appendices B and C of the textbook.
- **FE3** Basics of trigonometry (see Appendix D of the textbook).
- **FE4** Basics of exponential and logarithmic functions.
- **FE5** More advanced topics in trigonometry, including trig identities and the inverse trig functions (Appendix D).
- **FE6** rules for differentiation, including power rule, derivatives of trig, exponential, logarithmic, and inverse trig functions, product rule, quotient rule, and chain rule (Chapter 3).

These assignments are to be taken using WebWorK, outside of class, proctored by a student tutor in Esbenshade 368, and timed. However you may continue to retake these assignments (a different but similar version is generated each time) until you pass (where passing always means 80% or better).

While you essentially have until the last day of class to pass these assignments, suggested due dates are indicated on the attached schedule. Passing an FE assignment by the due date may add 1% to your final grade, as explained in the Grading Policy below.

Online (on WebWorK) you will see two more FE assignments:

- **FE1** Multiplying, dividing, adding, and subtracting fractions, parentheses, exponents, roots, factoring, difference of two squares, rationalizing using conjugates, and extracting factors from radicals.
- **FE7** basics of how the first and second derivatives affect the shape of a graph.

These two are not required and will not affect your grade.

**HOMEWORK and QUIZZES.** The last page of this syllabus contains a list of problems, by section, for all the material that we cover. This is your homework. Please take it seriously. Working the exercises is intended to help you learn, and give you some perspective on your progress. I suggest that you keep a notebook to write the homework in (this could be the same notebook in which you write your lecture notes).

You must solve all the problems as soon as we cover the corresponding section. If you were not able to solve all the problems listed, you are not ready to go on, and you should look for immediate help.

Help is available, but it is your responsibility to seek it:

- office hours – as listed at the beginning of the syllabus. Additional times might be set up by appointment.
- student tutors – available in room E370. Times will be posted beside the room and online.
- the Learning Center with a private tutor.

Homework will not be collected for grading, but if you do not do it regularly, you will not learn. To check how well you stick with your homework, nine 20-minute quizzes will be administered throughout the semester:

Quiz	Date	Sections	Quiz	Date	Sections
Quiz 1	September 4	App.B–D, 1.1	Quiz 6	October 28	4.1,4.2
Quiz 2	September 12	1.1–1.6	Quiz 7	November 7	4.3–4.5
Quiz 3	September 26	2.1–2.7	Quiz 8	November 14	4.7–4.8
Quiz 4	October 8	2.8,3.1–3.3	Quiz 9	November 21	5.1–5.2
Quiz 5	October 23	3.4–3.9			

The problems for the quizzes will be taken from the homework, either verbatim or with minimal changes. If you know how to do the homework, you should have no difficulty with the quizzes.

The quizzes will be worth 15% of your grade. A missed quiz cannot be made up. The lowest quiz score will be dropped.

The problems on the tests and the final exam will also be similar to (although not exactly the same as) the ones discussed in class or assigned as homework. Discipline yourself to write clear readable notes and solutions; they will be of great value as review.

Of course, the assigned problems should be considered to be a minimum. You should solve more problems, *especially* if you don't feel quite comfortable with any section.

**EXAMS.** In addition to the quizzes (aimed at checking how you are doing with the homework) and the FE assignments (aimed at checking your basic skills), there will be four in-class tests, on the following dates (tentatively):

TUESDAY, SEPTEMBER 16;

FRIDAY, OCTOBER 10;

MONDAY, NOVEMBER 3;

TUESDAY, NOVEMBER 25.

Each test is timed and will take 60 minutes. This time limit will be strictly enforced. Make up tests will not be given, except in cases of grave emergency (a permission must be obtained from me *in advance*).

There will be a comprehensive final exam on THURSDAY, DECEMBER 11, 2:30 TO 5:30PM. Note that this date and time have been set by the registrar's office and cannot be changed. Make your travel plans accordingly.

All exams and tests are closed-book. No books or notes of any sort are allowed. All work must be shown to receive full credit.

**GRADING POLICY.** If you have passed all five Basic Skills (Fundamental Elements) assignments by 5:00pm of the last day of classes, then your final grade will be calculated in the following way:

55% of the grade come from the four Tests, (15% each for the three best tests, and 10% the worst),

25% of the grade come from the Final Exam,

15% of the grade come from the 8 best Quizzes (lowest of the 9 will be dropped),

5% of the grade can be earned by passing the FE assignments by the due date in the syllabus.

These scores are combined to give a final number of points, between 0 and 100. Point ranges for the final grades are:

A	93-100
A-	90-92.9
B+	87-89.9
B	83-86.9

B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9

D+	67-69.9
D	63-66.9
D-	60-62.9
F	0-59.9

If you do not pass *all* FE assignments (i.e., FE2, FE3, FE4, FE5, and FE6) by 5:00pm of the last day of classes (Friday, December 5), then your grade for the course can be *at most* D+, according to the following table:

D+	99-69.9
D	63-66.9

D-	60-62.9
F	0-59.9

**SCHOOL CLOSURE POLICY.** Occasionally, the college is closed and classes are cancelled due to inclement weather or other emergency situations. To minimize the negative impact of such disruptions on your learning, the following School Closure Policy will be in effect for this course. In case of school closure, an alternative form of the lecture will be provided (voice-over slides, instructional video, additional assigned reading, or a combination of these), and you will still need to complete and turn in the homework assignment. Concrete details will be communicated to you at the time of the closure announcement. In case the closure falls on an exam day, an alternative date and time for the exam will be announced.

**INTEGRITY:** All work you submit for grading must be your own and must comply with the Standards of Integrity set forth in the Elizabethtown College Catalog. In particular, no collaboration on quizzes or exams is allowed.

**DISABILITIES.** Elizabethtown College welcomes otherwise qualified students with disabilities to participate in all of its courses, programs, services, and activities. If you have a documented disability and would like to request accommodations in order to access course material, activities, or requirements, please contact the Director of Disability Services, Lynne Davies, by phone (717-361-1227) or e-mail [daviesl@etown.edu](mailto:daviesl@etown.edu).

If your documentation meets the colleges documentation guidelines, you will be given a letter from Disability Services for each of your professors. Students experiencing certain documented temporary conditions, such as post-concussive symptoms, may also qualify for temporary academic accommodations and adjustments.

As early as possible in the semester, set up an appointment to meet with me, the instructor, to discuss the academic adjustments specified in your accommodations letter as they pertain to my class.

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The following is a tentative schedule. Most of the time we will follow it closely, but deviations are to be expected.

**MA121, Fall 2014**

**SCHEDULE**

Day	Date	Topic	Section	Quiz	Basic Skills
Mo	08/25	Coordinate Geometry and Lines	App.B		
Tu	08/26	Graphs of Second Degree Functiond	App.C		
Th	08/28	Trigonometric Functions	App.D		
Fr	08/29	Trigonometric Equations	App.D		
Tu	09/02	Four Ways to Represent a Function	1.1		
Th	09/04	New Functions from Old	1.3	Quiz 1	
Fr	09/05	New Functions from Old	1.3		
Mo	09/08	Seductive and Treacherous Technology	1.4		
Tu	09/09	Exponential Functions	1.5		
Th	09/11	Inverse Functions. Logarithms	1.6		
Fr	09/12	Properties of the Logarithmic Function	1.6	Quiz 2	
Mo	09/15	Review			
Tu	09/16	TEST 1			

*(continued on next page)*

MA121, Fall 2014 (continued)

Day	Date	Topic	Section	Quiz	Basic Skills
Th	09/18	The Tangent and Velocity Problem	2.1		
Fr	09/19	The Limit of a Function	2.2		
Mo	09/22	Calculating Limits Using Limit Laws	2.3		FE2 due
Tu	09/23	Continuity	2.5		
Th	09/25	Limits at Infinity	2.6		
Fr	09/26	Derivatives and Rates of Change	2.7	Quiz 3	
Mo	09/29	The Derivative as a Function	2.8		
Tu	09/30	Derivatives of Polynomials, Exponential	3.1		
Th	10/02	The Product and Quotient Rules	3.2		
Fr	10/03	Derivatives of Trigonometric Functions	3.3		
We	10/08	Derivatives of Trigonometric Functions	3.3	Quiz 4	
Th	10/09	Review			
Fr	10/10	TEST 2			
Mo	10/13	The Chain Rule	3.4		FE3 due
Tu	10/14	Implicit Differentiation	3.5		
Th	10/16	Derivatives of Logarithmic Functions	3.6		
Fr	10/17	Derivatives in Natural and Social Sciences	3.7		
Mo	10/20	Exponential Growth and Decay	3.8		
Tu	10/21	Related Rates	3.9		
Th	10/23	Related Rates	3.9	Quiz 5	
Fr	10/24	Maximum and Minimum	4.1		
Mo	10/27	The Mean Value Theorem	4.2		FE4 due
Tu	10/28	Derivatives and the Shape of a Graph	4.3	Quiz 6	
Th	10/30	Derivatives and the Shape of a Graph	4.3		
Fr	10/31	Review			
Mo	11/03	TEST 3			
Tu	11/04	Indeterminate Forms and L'Hôpital's Rule	4.4		
Th	11/06	More Indeterminate Forms. Curve Sketching	4.4,4.5		
Fr	11/07	More Curve Sketching	4.5	Quiz 7	
Mo	11/10	Optimization Problems	4.7		FE5 Due
Tu	11/11	More Optimization	4.7		
Th	11/13	Newton's Method	4.8		
Fr	11/14	Antiderivatives	4.9	Quiz 8	
Mo	11/17	More Antiderivatives	4.9,App.E		
Tu	11/18	Areas and Distances	5.1		
Th	11/20	The Definite Integral	5.2		
Fr	11/21	The Fundamental Theorem of Calculus	5.3	Quiz 9	FE6 Due
Mo	11/24	Review			
Tu	11/25	TEST 4			
Mo	12/01	The Net Change Theorem	5.4		
Tu	12/02	The Substitution Rule	5.5		
Th	12/04	More Substitutions	5.5		
Fr	12/05	Review			
Th	12/11	FINAL EXAM 2:30 – 5:30pm, N 207			

## Homework Assignments by Section

<b>Appendices</b>	
B	1,5,7,9,11,12,15,17,21,23,25,27,29,31,32,33,34,35,37,43,49,51,53,55,57,59
C	1,3,5,7,9,33,37,38
D	1,3,5,7,9,11,17,19,21,23,24,25,26,27,28,29,31,33,35,37,43,59,61,63,65,67,69
<b>Chapter 1: Functions and Models</b>	
1.1	3,7,9,21,23,25,27,29,31,31,33,35,37,39,43,45,47,49,50,57,59,61,63,69,72,73,75,77
1.3	1,3,4,5,6,7,9,13,17,21,23,27,29,31,33,35,37,39,51; App. D: 77,78,81,82
1.5	1,3,5,11,15,17,18,19,21
1.6	3,5,7,9,11,13,15,16,17,21,23,25,29,35,37,38,39,41,49,51,52,53,55,57,63,65,67,71
<b>Chapter 2: Limits and Rates of Change</b>	
2.1	3,5,7a
2.2	4,5,6,7,9,11,15,16,17,19,21,23,25,29,30,31,33,35,37,38a,41
2.3	1,2,11,13,15,17,21,23,25,27,29,37,39,48,50,51,57
2.5	3,5,6,7,17,19,21,23,41,43,45,51,53,55
2.6	3,4,5,7,9,11,13,15,17,19,21,23,25,29,31,33,40,41,43,45,59,61
2.7	3,7,13,16ab,17,18,19,21,27,33,35
2.8	1,3,5,7,9,11,23,27,37,39,43,45
<b>Chapter 3: Derivatives</b>	
3.1	3-25 odd,29,33,37,43,47,51,53,55,57,63,67,75
3.2	1-21 odd,27,29,31,33,35,41,43,45,47,49,51
3.3	1-25 odd , 29,31,39,41,43,46,49
3.4	7-41 odd,47,51,53,55a,59,61,63,65,71,73
3.5	3-19 odd,27,29,31,35,37,49,51,53,55,57
3.6	3-15 odd, 19,21,23,27,29,31,33,43,45,47,49,51
3.7	1,7,8,9
3.8	3,5a,9,10,11,13,15,19a
3.9	1,5,7,9,11,13,15,19,20,27,28,29,30,41
<b>Chapter 4: Applications of Differentiation</b>	
4.1	3-39 odd,47,49,51,53,59,61
4.2	1,3,7,9,11,13
4.3	1,5,7,8,9,11,15,17,19,23,25,27,29,31,33,35,39,41
4.4	7-21 odd,25,29,31,33,35,39,41,43,45,47,49,51,54,55,57,59,61,63,65
4.5	1,5,15,17,21,29,37,45,51
4.7	3,5,7,12,13,15,17,19,21,33,37,39,52
4.8	1,3,4,5,7,11,13,15,17,19
4.9	1-17 odd, 21,25,27,33,37,39,43,49,51,53,55,59,61,65,69,75
<b>Appendix E: Summation Notation</b>	
E	1,5,7,11,13,15,17,19,21,25,27,29,31,33,35,43,45
<b>Chapter 5: Integrals</b>	
5.1	1a,3,5,19,21
5.2	1,3,5,9,11,21,23,33,34,35,37,39,41,43,47,49,51,53,57
5.3	3-41 odd,45,55,57,69
5.4	1,3,5,7,9,11,15,17,21,23,25,27,29,31,33,35,37,39,41,43
5.5	1,3,5,7,9,11,13,17,21,23,25,27,29,31,33,35,43,47,53,55,57,59,63,67,69