

Math 153 – WvEB Calculus

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Note: When sending an e-mail, include “WvEB Calc” in the subject.

Textbook: Essential Calculus, Early Transcendentals, by James Stewart, 8th Ed. Thomson Brooks/Cole, 2016.
(ISBN 0495014281 – hardback)

Pre-Requisites: B or better in WvEB Algebra and WvEB Trigonometry

The general goals of this course are common to all the courses in the Institute for Math Learning at WVU:

- **CONCEPTUAL UNDERSTANDING:** rather than just rote memorization of algorithms
- **MULTIPLE APPROACHES:** to examine problems from analytical, geometric and numeric perspectives, to make judgments about the appropriateness of the choice of formal or approximate methods of solution
- **TECHNOLOGY AS A TOOL:** use technology as an integral part of the process of formulation, solution, and communication, to gain experience in selecting the proper tool for a given problem
- **ACTIVE STUDENT LEARNING:** to engage in the exploration and discovery of concepts and to learn to work cooperatively to solve problems
- **COMMUNICATION OF IDEAS:** to demonstrate understanding by explaining in written or oral form the meanings and applications of concepts
- **PROBLEM SOLVING:** gain experience as a problem solver, to analyze problems in an organized manner
- **APPLICATIONS:** use mathematics to model and solve problems

The specific goals of this course will be to stress an algebraic, graphic, and numeric approach to the study of:

- the concept of function and families of functions
- using functions as models and applying modeling techniques to problem solving
- using the derivative as a tool to solve problems involving rates of change

To accomplish course goals, the class incorporates interactive laboratories which use technology and student activities that emphasize writing and student collaboration. Students will work in pairs or triads on the laboratories in order to develop mathematical communication skills. The development of your communication skills is an integral part of the course.

Evaluation: Multiple forms of assessment will be used to measure your understanding of algebraic concepts and problem solving. The point distribution of these assessments is:

Assessment		Number	Points	Percent of Grade
1	Participation	?	100	11.11%
2	Homework	21	100	11.11%
3	Labs	10	100	11.11%
4	Tests	3	400	44.44%
5	Comprehensive Final	1	200	22.22%
TOTAL			900	100%

Grading Scale: 90% – 100% A
80% – 89% B
70% – 79% C
60% – 69% D
0% – 59% F

Participation and Attendance: You will be awarded up to 100 participation points for the course. Each individual course facilitator will determine how 70 of these points are awarded for any combination of points from attendance, homework, portfolio, notebook, or other school requirement. The remaining 30 points will be earned from a variety of course requirements (surveys, Discussion Board posts).

Homework: Homework will be graded in two ways. A small number of questions will be graded for correctness on eCampus. These questions will be due at 8:00 AM on the day of the test that covers that material. Students will have multiple attempts for these homework assignments. Students must also complete all of the problems on the extended homework list. The in-class teacher will check this homework (0%, 25%, 50%, 75%, or 100%). Students receive that percent of the score on they earned on the eCampus part.

Homework Grade = (Teacher Percent) x (eCampus Score)

Laboratories: There will be 10 laboratory assignments, which should be done with a partner. Nine labs will have an eCampus component. The labs will be due at 8:00 AM on the day of the test that covers that material. Students will have 2 attempts for each lab. Students must also complete the lab worksheet.

Tests: There will be three tests given throughout the semester; each is worth 135 points. **All exams** are individual assessments and are to be proctored. They are closed book and closed note. No formula sheets, computer screens other than the test, or notes (paper, nor calculator) are permitted. **CALCULATORS ARE NOT ALLOWED ON TESTS.** The Final Exam must be received by **4:00 PM on Friday, December 20.**

Calculus Pre-Test: The Calculus Pre-Test is worth up to 10 points of Extra Credit.

$1 \leq \text{number correct} \leq 14$, earn 1 bonus point	$27 \leq \text{number correct} \leq 28$, earn 6 bonus points
$15 \leq \text{number correct} \leq 18$, earn 2 bonus points	$29 \leq \text{number correct} \leq 30$, earn 7 bonus points
$19 \leq \text{number correct} \leq 20$, earn 3 bonus points	$31 \leq \text{number correct} \leq 32$, earn 8 bonus points
$21 \leq \text{number correct} \leq 22$, earn 4 bonus points	$33 \leq \text{number correct} \leq 34$, earn 9 bonus points
$23 \leq \text{number correct} \leq 26$, earn 5 bonus points	$35 \leq \text{number correct} \leq 40$, earn 10 bonus points

Grade Disputes: If you feel that a question was graded incorrectly on a homework, lab, or test, then you **MUST** contact Dr. Schraeder within 2 weeks of the release of the score (when it is posted on eCampus). Any dispute brought up after 2 weeks will **NOT** be considered. Check your grades often to make sure that they are accurate.

Social Justice and Disability: West Virginia University is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (304-293-6700).

This course has been certified as part of WVU's Liberal Studies Program, Math and Natural Sciences (cluster C). The course will focus in part on developing your ability to communicate effectively, understand alternative views and cultures, and use quantitative and scientific knowledge accurately.

Help: On an average, you should expect to study two hours outside of class for each one hour in class. If you are spending more, then you may need to seek help! There are several excellent sources for such help. First, seek help from your classmates; use the WEBCT discussion group to get help or set up a study group. Often classmates can explain the problem clearly since they have been working on it. You may also seek assistance from your facilitator.

Homework List

Section	Name	Problem Numbers
1.1	Four Ways to Represent a Function	3, 8, 14, 15, 25, 27, 28, 32, 35, 41, 43, 57, 59, 64, 71, 73, 74
1.2	Mathematical Models: A Catalog of Essential Functions	1, 4, 5, 7, 11, 13, 15, 17, 18, 19, 29
1.3	New Functions from Old Functions	2, 3, 5, 9, 10, 19, 31, 32, 37, 41, 43, 50, 52, 53, 55, 58, 59
1.4	Exponential Functions	1, 3, 6, 7, 9, 11, 13, 15, 17, 19, 23, TEC 001*
1.5	Inverse Functions and Logarithms	1, 3, 5, 8, 10, 11, 15, 17, 21, 23, 25, 29, 35, 41, 47, 49, 51, 53, 55, 61
2.1	The Tangent and Velocity Problems	1, 2, 3, 5, 6, 7
2.2	The Limit of a Function	1, 2, 3, 4, 8, 9, 11, 17, 22, 25, 30, 31, 38, 40
2.3	Calculating Limits Using the Limit Laws	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 18, 20, 30, 37, 38, 52
2.4	The Precise Definition of a Limit	3, 6, 13, 14
2.5	Continuity	3, 5, 7, 10, 11, 20, 23, 25, 31, 35, 36, 39, 43, 45, 53, 55
2.6	Limits at Infinity: Horizontal Asymptotes	2, 3, 5, 7, 15, 19, 22, 25, 27, 29, 35, 37, 41, 49, 52, 58
2.7	Derivatives and Rates of Change	3, 4, 6, 7, 18, 23, 31, 33
2.8	The Derivative as a Function	3, 4, 5, 6, 10, 21, 23, 26, 27, 29
3.1	Derivatives of Polynomials and Exponential Functions	3, 6, 9, 13, 16, 23, 33, 34, 42, 46, 47, 48, 49, 55
3.2	Inverse Functions and Logarithms	1, 3, 5, 7, 9, 11, 13, 14, 17, 19, 21, 23, 27, 28, 31, 35, 36, 43, 58, 60
3.3	The Product Rule and Quotient Rule	1, 3, 4, 5, 9, 11, 12, 15, 17, 22, 25, 28, 31, 35, 36, 37, 39
3.4	The Chain Rule	1, 3, 7, 11, 17, 19, 21, 23, 28, 31, 35, 45, 53, 55, 61, 62, 63
3.5	Implicit Differentiation	5, 9, 11, 15, 17, 20, 25, 29, 30, 35, 39, 73, 76
3.6	Derivatives of Logarithmic Functions	2, 3, 6, 9, 12, 13, 15, 16, 19, 23, 39, 41, 43, 44, 45, 46, 47, 48, 49
3.7	Rates of Change in the Natural and Social Sciences	1, 5, 7, 8, 15, 16, 22, 25
3.8	Exponential Growth and Decay	1, 3, 5, 9, 10, 15, 17, 20

Tentative Schedule

Unit	Week	Section	Lecture	Lab	Test
1	1	1.1	Functions	Lab 0 – Graphing Functions	
	2	1.2 – 1.3	Essential Functions, Transformations	Lab 1 – Trig Review	
	3	1.4	Exponential Functions	Lab 2 – Exponential Functions	
	4	1.5	Inverse and Logarithmic Functions		
	5	2.1	Tangent and Velocity		Test 1
2	6	2.2 – 2.3	Limits	Lab 3 – Concept of a Limit	
	7	2.4 – 2.5	Limits and Continuity	Lab 4 – Limits and Continuity	
	8	2.6	Limits at Infinity		
	9	2.7 – 2.8	Derivatives	Lab 5 – Secant and Tangent Lines	
	10	3.1 – 3.2	Polynomial, Exponential, Inverse, Log Derivatives	Lab 6 – Derivative as a Function	Test 2
3	11	3.3	Product Rule and Quotient Rule		
	12	3.4 – 3.5	Chain Rule, Implicit Differentiation	Lab 7 – Implicit Differentiation	
	13	3.6	Derivatives of Logarithmic Functions	Lab 8 – Logarithms	
	14	3.7 – 3.8	Exponential Growth and Decay	Lab 9 – Exponential Growth and Decay	Test 3
	15	ALL	Review		
	16	ALL	Review		Final Exam