

**Syllabus for SM121(w/ Tuesday class)    Calculus I**  
**Fall Semester, 2011-2012**

**TEXT:** *CALCULUS, Early Transcendentals*, Seventh Edition, by James Stewart

Chp t	Wk	Lesson	Section	TOPIC	PROBLEMS
1. Functions and Models	1	1	App B	Coordinate Geometry & Lines	p. A15: 1,6,9,12,18,26,27,29,36,42
		2	App D	Trigonometry	p. A32: 3,10,13,20,23,37,59,67, <a href="#">Wave Lab</a>
		3	1.1	Representing Functions	p. 19: <b>1,6,9,12,21,23,29,35,40,50,59,72,73</b>
		4	1.2	Math models: essential functns	p. 33: 3,4,6,13,17,19,20,25
	2	5	1.3	New functions from old	p. 42: <b>1,3,4,10,13,20</b>
		6	1.3	(continued)	p. 43: <b>28,35,42,50,51,55</b>
		7	1.5	Exponential functions	p. 57: <b>3,8,15,17,20,21,25,30, <a href="#">Parachute Lab</a></b>
	3	8	1.6	Inverse functions	p. 69: 1,3,5,6,11,18,19,22,29
		9	1.6	Logs and inverse trig	p. 70: 35,37,41,52,53,62,65,70
		10		Review	
		11		Review	
		12		Test 1	
2. Limits and Derivatives	4	13	2.1	Tangent and velocity	p. 86: 1,3,5,7, <a href="#">Tower Lab</a>
		14	2.2	Limit of a function	p. 96: 2,5,7,8,11,17,18,21,30,38,46
		15	2.3	Limit laws	p. 106: 1,2,4,11,17,22,36,47,48,60
	5	16	2.5	Continuity	p. 127: 1,2,4,6,10,21,43,51,53,63
		17	2.6	Limits involving infinity	p. 140: 1,2,3,7,12,17,20,44,59,61
		18	2.7	Derivatives & rates of change	p. 150: 1,3,7,11,14,17,18,19
		19	2.7	(continued)	p. 151: 27,32,34,37,44,48
	6	20	2.8	Derivative as a function	p. 162: 1,3,6,9,10,16,23&27(PROOFS), 40,43, <a href="#">Radar Lab</a>
		21		Review	
		22		Review	
23			Test 2		
3. Differentiation Rules	7	24	3.1	Derivatives of polynomials	p. 181: 3,6,7,10,13,19,23,25,29,31,38,51,58
		25	3.2	Product and quotient rules	p. 187: 1,2,4,5,10,21,26,33,43,49,50
		26	3.3	Trig derivatives	p. 197: 1,2,5,6,15,17,18
		27	3.3	(continued)	p. 197: 23,25,34,35,39,40
	8	28	3.4	Chain Rule	p. 205: 1,5,7,9,13,15,30,40,49
		29	3.4	(continued)	p. 205: 55,61,63,66,76,83,92(PROOF)
		30	3.5	Implicit differentiation	p. 215: 1,8,10,12,21,27
	9	31	3.5	(continued)	p. 216: 50,51,62,67,77
		32	3.6	Derivatives of logs	p. 223: 2,3,7,11,23,26
		33	3.6	(continued)	p. 223: 27,34,39,43,48
		34	3.7	Rates of change	p. 233: 1,8,11,13,15,17,33,34
	10	35	3.9	Related rates	p. 248: 1,11,15,18,20, <a href="#">Rates Lab</a>
		36	3.9	(continued)	p. 249: 27,30,31,33,35,40
		37	3.10	Linear approximations	p. 253: 1,2,5,7,23,26,43
		38		Review	
11	39		Review		
	40		Test 3		
	41	4.1	Max and min values	p. 280: 1,2,3,6,9,11,22,29,38,43,47,48,56	
12	42	4.2	Mean Value Theorem	p. 288: 1,7,11,13,17,34	
	43	4.3	Derivatives and shapes	p. 297: 1,3,6,7,9,16, Prove the Increasing Test (p. 290)	
	44	4.3	(continued)	p. 298: 19,25,26,31,33,45,64	

Topics of Diff	13	45	4.4	Indeterminate forms	p. 307: 1,2,5,6,17,21	
		46	4.4	(continued, with L'Hospital)	p. 308: 33,34,39,46,51,61	
		47	4.5	Summary of curve sketching	p. 317: 1,3,9,12	
		48	4.5	(continued)	p. 317: 21,31,33,49	
		49	4.7	Optimization problems	p. 331: 1,4,11,14,19	
	14	50	4.7	(continued)	p. 332: 22,32,34,35,46	
		51	4.9	Antiderivatives	p. 348: 2,12,17,25,30,49,51,54,74	
	5. Integrals	15	52	5.1	Areas and Distances	p. 369: 2,4,10,13,18,21, <a href="#">Deck Lab</a>
			53	5.2	The Definite Integral	p. 382: 1,5,7,11,16,34,37,49
			54	5.3	The Fundamental Thm of Calc	p. 395: 3,9,11,16,19,24, <a href="#">FTC applet</a>
55			5.3	(continued)	p. 396: 26,29,31,32,42,43,45	
56			5.4	Indefinite Integrals	p. 403: 1,3,9,16,19,25,27,62,68	
16		57		Review		
		58		Review		
		59		Test 4		
		60		Review for Final Exam		

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#### NOTES:

1. All students should use the access card information from their individual textbook to enroll in WebAssign. Even if their instructor does not use WebAssign this semester, they should enroll now so that they will be able to use it in future semesters. **Bold face** problems in this syllabus are not available in WebAssign.

#### 2. Objectives:

- To review algebra and trigonometry through their use in calculus.
- To review and expand upon the concepts of functions and graphs.
- To introduce the concepts of limit and continuity.
- To study the concept of the derivative along with its graphical, numerical, and algebraic properties.
- To study methods for evaluating derivatives.
- To apply derivatives to a number of practical problems including optimization, related rates, graphing, etc.
- To study the concept of integration.
- To use the calculator to reinforce the above concepts and objectives in an appropriate manner.

3. A web site at <http://www.usna.edu/MathDept/website/local/courses/fall2012.html> will have the most up to date information about the course, including this syllabus, practice exams, web links, and the online labs which appear in the homework assignments (also at the site [http://www.usna.edu/MathDept/website/local/courses/calc\\_labs/labs.html](http://www.usna.edu/MathDept/website/local/courses/calc_labs/labs.html)).

4. Three proofs are assigned in the syllabus. At least one of them will be asked for on the final exam. The goal is for students to participate in the rigorous justification of a few mathematical concepts, thereby gaining a better appreciation of that aspect of mathematics and a better understanding of those concepts. The proofs are:

- Proving the formula for the derivative of a quadratic root from the definition as in Lesson 20, Section 2.8, exercises 23 or 27.
- Proving the quotient rule using the product rule and chain rule as in Lesson 29, Section 3.4, exercise 92.
- Proving the Increasing Test, Lesson 43, Section 4.3, page 290.

5. If you would like help in the course, you should contact your instructor for extra-instruction. If your instructor is not available, try the **Math Lab** in CH130. It is staffed all six class periods every class day with instructors who should be able to answer your questions. Also see the Midshipmen Group Study Program (MGSP) for group study in the evening led by upper classmen.

6. Exercises that ask for verbal explanations should be answered with complete sentences.

7. All students in this course are expected to have the TI-Nspire CX CAS calculator with the capability of doing symbolic calculations. There will be assignments that use such a calculator as well as questions on the common final exam on which it is expected that the student has such a calculator. There will also be problems for which no calculator is allowed. An on line handbook for the calculator is available at:

[http://education.ti.com/calculators/downloads/US/Software/Download/en/6829/7210/TI-Nspire\\_CX\\_Handheld\\_GettingStarted\\_EN.pdf](http://education.ti.com/calculators/downloads/US/Software/Download/en/6829/7210/TI-Nspire_CX_Handheld_GettingStarted_EN.pdf)

8. Classes on Tuesday, 06 September will follow a Monday schedule. The last day of classes is Friday 09 December. There's a Review & Study day scheduled for Monday 12 December. There are 60 class days in both the MWRF and in the MTWF schedule. The Final Exam period is 13 December – 20 December.

9. There will be two “gateway” quizzes: one on precalculus and one on differentiation. For samples and explanation see: <http://www.usna.edu/MathDept/website/local/courses/gateways/gateways.html>