MAT 127 Calculus C

STONY BROOK
STATE UNIVERSITY OF NEW YORK

Department of Mathematics
Stony Brook University

Web page for Lecture 1 (MWF 9:35-10:30 am, Javits Lectr 103)

Web page for Lecture 2 (TuTh 2:20-3:40 pm, Physics P118)

Web page for Lecture 3 (TuTh 2:20-3:40 pm, Physics P131)

Web page for Lecture 4 (TuTh 5:20-6:40 pm, Hvy Engr Lab 201)

MAT 127 Calculus C

Spring 2009

Department of Mathematics
Stony Brook University

Web page for Lecture 1

This is the final course of the three-semester calculus sequence MAT 125, 126 and 127. We will study differential equations, sequences and series, power series and their applications.

Textbook: *[Calculus: Concepts and Contexts. Single Variable (Stony Brook University Edition)](...)*, by James Stewart, 3rd edition.

Instructor: Prof. Leon Takhtajan, Math Tower 5-111; phone 632-8287, email *[leontak@math.sunysb.edu](...)*

Office Hours: Monday, 5-6 pm and Tuesday, 3-4 pm in 5-111.

Class schedule: MWF 9:35-10:30 am in Javits Lecture Center 103.

Grader: Long Li, Math. Tower, S-240C, e-mail *[llong@math.sunysb.edu](...)*

Office Hours: Thursday, 6-8 pm in S-240C.

[Syllabus and homework assignments:](...)

Exams:

- **Midterm I, Monday, Feb. 23, 8:30-10:00 pm in ESS 001.** The exam will cover Sections 7.1 through 7.4 and a section on second order linear differential equations; a separate set of notes for this topic in available in the homework assignment.
- **Midterm II, Tuesday, Mar. 24, 8:30-10:00 pm in ESS 001.** The exam will cover Sections 7.5 and 7.6, Sections 8.1 through 8.3 and anything that needs further testing from the previous part of the course.
- **Final Exam, Firday, May. 15, 8:00-10:30 am in Javits Lecture Center 102.** The exam will cover the material in the first two parts of the course as well as the rest of Chapter 8.

Review material: Midterms I and II, homeworks and quizzes: **Quiz 2, Quiz 3, Quiz 4, Quiz 5, Quiz 6, Quiz 7, Super-quiz, Quiz 9, Quiz 10, Quiz 11**.

No calculators and no notes, books, etc., are allowed at the exams. The problems will require pencil and paper reasoning only.

DSS advisory. If you have a physical, psychiatric, medical, or learning disability that may affect your ability to carry out the assigned course work, please contact the office of Disability Support Services (DSS) at 632-6748/TDD or http://studentaffairs.stonybrook.edu/dss. DSS will review your concerns and determine what accommodations may be necessary and appropriate. All information and documentation of disability is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: http://sunysb.edu/ehs/fire/disabilities.shtml.

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Web page for Lecture 4

This is the final course of the three-semester calculus sequence MAT 125, 126 and 127. We will study differential equations, sequences and series, power series and their applications.

Textbook: *Single variable calculus (Stony Brook University Edition)*, by James Stewart, 3rd edition.

Instructor: Prof. Pawel Nurowski, Math Tower 3-102; phone 632-8884, email *nurowski@math.sunysb.edu*

Office Hours: Tue, Th 3pm-4pm, Math Tower, rm 3-102

Class schedule: TuTh 5:20-6:40 am in Hvy Eng Lab 201.

Grader: TBA

Office Hours: TBA

Syllabus and homework assignments:

Exams:

- **Midterm I, Monday, Feb. 23, 8:30-10:00 pm.** The exam will cover Sections 7.1 through 7.4 and a section on second order linear differential equations; a separate set of notes for this topic in available in the homework assignment. **Location for the Midterm I: Hariman Hall 137**
- **Midterm II, Tuesday, Mar. 24, 8:30-10:00 pm.** The exam will cover Sections 7.5 and 7.6, Sections 8.1 through 8.3 and anything that needs further testing from the previous part of the course. **Location for the Midterm II: Hariman Hall 137**
- **Final Exam, Friday, May. 15, 8:00-10:30 am.** The exam will cover the material in the first two parts of the course as well as the rest of Chapter 8. **Location for the Final Exam: Javits 110**
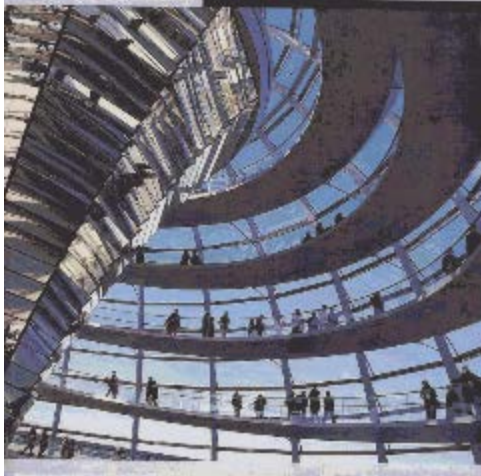
- **No calculators and no notes, books, etc., are allowed at the exams**. The problems will require pencil and paper reasoning only.

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Stewart

Single Variable Calculus

Stony Brook University Edition

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This course is the third semester of the three-semester calculus sequence MAT 125, 126 and 127. We will study differential equations, sequences and series, power series and their applications. We will heavily rely on the material covered in MAT 125 and 126 and you are supposed to review the basic topics there. Specifically, you **are responsible** for the basic material in **Sections 1.5, 1.6, 2.2-2.8, 3.1, 3.2, 3.4-3.7, 4.2, 4.3, 4.5, 4.9, 5.3-5.7, 5.10**, and in **Appendices A-C, F**.

Lectures: New material is presented each week in the lectures. You should read the corresponding section of the text before attending each lecture. Though attendance will not be enforced (no sign-up sheets), it is highly recommended: **quizzes** that contribute to the total grade will be given each Friday in class.

Homework: Problem solving is an essential part of the course. You are encouraged to discuss homework problems with other students. However, **each student must write up the homework individually, in his/her words** rather than merely copying someone else's. You will be required to turn in your homework assignment in the first class meeting following the week it was assigned. For example, the problems for the week 1/25-1/31 are due on Wednesday, February 4 (this refers to our lecture section 1). Questions about the grading of the homework should be directed to the grader. Only four or five of the problems will be graded, but which ones will not be announced in advance. Each graded problem is worth up to 4 pts (maximum score is 16 pts which is more than the 15pts mentioned below, but this is to the student's advantage). **Late homework will not be accepted.** The homework must be stapled WITH A METALLIC STAPLE. Show your work towards the answer: a correct answer with an incorrect or absent procedure will yield 0 points. You should always try to solve the problem completely instead of relying on the partial credit.

Examinations: There will be two evening midterm tests, on Monday, February 23 and on Tuesday, March 24; both exams will be held from from 8:30 to 10:00 PM. The final exam will be on Friday, May 15 from 8:00 to 10:30 AM. **Make certain that you you are available at these times,** as there will be **absolutely no make-ups** for missed mid-term exams. Calculators, books, notes, etc. **are not allowed** during exams. If you miss an exam for an acceptable reason and provide me with an acceptable written excuse, the relevant mid-term will be `dropped' in computing your course grade. A letter stating that you were seen by a doctor or other medical personnel is **not** an acceptable document. An acceptable document should state that it was **reasonable/proper** for you to seek medical attention and was

medically **necessary** for you to miss the exam (the note/letter need not state anything beyond this point). Incomplete grade will be granted only if **documented circumstances beyond your control** prevent you from taking the final exam. **You must have ID to be admitted to exams.**

Grading: your course grade will be based on your examination performance and homework, weighted as follows:

Midterm I	25%
Midterm II	25%
Final Exam	35%
Homework and quizzes	15%

Help:

- [Math Learning Center](#)
- [P.A.S.S.](#) (For information on student-government funded tutoring service)

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Schedule (tentative): The following is the basic syllabus, but not all topics in each section will get covered. You should read the relevant parts of the book **before** class.

Week	Section	Notes	Homework
1/25-1/31	7.1 and 7.2		**7.1:** 1,2,3,4,6,10,12; **7.2:** 1,2,3,4,5,7,8,14, 22.
2/1-2/7	7.3	**Feb 6: Last day to drop a class without a "W" recorded**	**7.3:** 1,2,3,4,10,12,15, 16,23-26 (no graphing for these), 34,35,36
2/8-2/14	7.4 and [ODE lecture notes](#)		**7.4:** 1,2,9,10,14,18, 20; **ODE notes:** 1-8 (all of them)
2/15-2/21	[ODE lecture notes](#) and midterm I review		**ODE notes:** 9-16 (all of them)

2/22-2/28	7.5, 7.6	**Midterm I, Monday, Feb. 23, 8:30-10:00 pm**	**7.5:** 1,3,6,7,9; **7.6:** 1,3, 4
3/1-3/7	8.1		**8.1:** 3-6,9-14,15,17, 19,20,23,24,27,38-42
3/8-3/14	8.2	**March 12: Last day for removal of Incomplete grades and to resolve NR grades**	**8.2:** 4-8 (no graphing for these) 11-20,22, 24,28,32
3/15-3/21	8.3 and midterm II review		**8.3:** 1-3,6-20
3/22-3/28	8.4	**Midterm II, Tuesday, March 24, 8:30-10:00 pm March 27: Last day to change to or from P/NC option and to drop a class ("W" will be recorded)**	**8.4:** 2-5,7-8,12-13,20-26
3/29-4/3	8.5 and 8.6		**8.5:** 3-14; **8.6:** 3-11
4/5-4/11		**Spring Recess**	
4/12-4/18	8.6 and 8.7		**8.6:** 13,14,22,24; **8.7:** 1,3,4,6,8-12,16
4/19-4/25	8.7		**8.7:** 20-24,34,36, 41-43
4/26-5/2	8.8 and 8.9 (no applications to physics)		**8.8:** 1,2,3,4,10; **8.9:** 3-7 (no graphing); 11,13,15 (for these: parts a) and b) only); 19 (with error less than 0.00001);
5/3-5/9	Review		
5/10-5/16		**Final Exam Friday, May 15, 8:00-10:30 am**	

QUIZ 2 SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

1. (a) Verify that for every C the function
$$y = \frac{\ln x + C}{x^2},$$
defined for $x > 0$, satisfies the differential equation
$$x^3 y' + 2x^2 y = 1.$$

(b) For this differential equation, solve the initial value problem $y(1) = 2$.

2. Find the equilibrium solutions for the following differential equations:

(a) $y' = x^5 \cos y$

(b) $y' = 16 - y^2$.

QUIZ 3 SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

1. Solve the following differential equations.
  (a) $xy' = 5y$ (find general solution)

  (b)

$$y' = \frac{2\sin x}{y^2} \quad \text{with initial condition} \quad y(0) = 3.$$

QUIZ 4 SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

1. Solve the following initial value problem
$$y'' - 2y' + 5y = 0 \quad \text{and} \quad y(0) = 1,\ y'(0) = 0.$$

QUIZ 5 SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

1. Find the following limits:
  (a)
$$\lim_{n\to\infty} \frac{n^2}{\sqrt{n^4 - 1}}$$

  (b)
$$\lim_{n\to\infty} \frac{\ln n}{\sqrt{n}}$$

2. Determine whether the following series is convergent or divergent. If convergent, find the sum of the series.
$$\sum_{n=1}^{\infty} \frac{3 + 2^n}{4^n}$$

QUIZ 6 SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

Determine whether the following series is convergent or divergent. Answers without justification will get no partial credit.

(a)
$$\sum_{n=1}^{\infty} \frac{2n^2}{n^4 + 5}$$

(b)
$$\sum_{n=1}^{\infty} \frac{5 + 3^n}{2^n}$$

(c)
$$\sum_{n=2}^{\infty} \frac{1}{\sqrt{n^4 - 2}}$$

QUIZ 7 SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

Determine whether the following series is convergent or divergent. Answers without justification will get no partial credit.

(a)
$$\sum_{n=1}^{\infty} \frac{1 + \sin(n)}{10^n}$$

(b)
$$\sum_{n=1}^{\infty} \frac{n + 5}{\sqrt{n^5 + n^2}}$$

(c)
$$\sum_{n=1}^{\infty} n^3 e^{-n^4}$$

SUPERQUIZ SPRING 2009 MAT 127 LECTURE 1

Name: **SB ID:**

Determine whether the following series is convergent or divergent. Answers without proper justification will get no partial credit.

1.

$$\sum_{n=1}^{\infty} \frac{\cos^3 n}{2^n}$$

2.

$$\sum_{n=2}^{\infty} \frac{1}{\sqrt{n}(\sqrt{n}-1)}$$

3.

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$$

4.
$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt[3]{n}}$$

5.
$$\sum_{n=1}^{\infty} \frac{n!}{e^n}$$

6.
$$\sum_{n=1}^{\infty} \frac{n^{10}}{2^n}$$

Name: **SB ID:**

Find the radius of convergence and the interval of convergence for the following power series. Answers without justification will get no partial credit.

1.

$$\sum_{n=1}^{\infty} \sqrt{n}\, x^n$$

2.

$$\sum_{n=1}^{\infty} \frac{x^n}{n 3^n}$$

Name: **SB ID:**

Find the Taylor series for $f(x)$ centered at the given value of a, and find the corresponding radius of convergence. Answers without justification will get no partial credit.

1.
$$f(x) = \ln x, \quad a = 10$$

2.
$$f(x) = \frac{1}{x}, \quad a = 5$$

3. Find Maclaurin series for $f(x) = x \cos 4x$.

Name: **SB ID:**

1. Consider the power series
$$\sum_{n=1}^{\infty}(-1)^{n-1}\frac{(3x)^n}{n}.$$
(a) Find the radius of convergence.
(b) Find the interval of convergence.

2. Find the Taylor series and the radius of convergence for
$$f(x) = \frac{1}{x^2} \quad \text{at} \quad a = 7.$$

3. Find the sum of the series
$$\sum_{n=0}^{\infty}(-1)^n\frac{\pi^{2n+1}}{6^{2n+1}(2n+1)!}.$$

1

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