Course Syllabus

MA 225 -Infinite Series

[School of Engineering and Science/Department of Mathematical Sciences]

[Fall 2022]

Instructor: Mahmood Sohrabi

Course Schedule:

Section A: MWF 10:00-10:50 Howe 102

Section B: MWF 11:00-11:50 Kidde 360

Contact Info: msohrab1@stevens.edu

Office Hours: Monday and Wednesday: 2:45- 3:45 in North 308 or via Zoom:
https://stevens.zoom.us/j/99978737921 (https://stevens.zoom.us/j/99978737921)

Prerequisite(s): MA 126

COURSE DESCRIPTION

This course introduces students to infinite sequences, series, power series and their applications. Topics include convergence properties of sequences and series, power series and their convergence

intervals, Taylor polynomials and Taylor series for smooth functions of one or multiple variables.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will be able to…

- State fundamental properties of infinite series and apply them, as appropriate.
- Determine convergence and divergence of infinite series through applying appropriate tests.
- Recognize various types of convergence.
- Find power series representations of a function.
- Find the interval of convergence of a power series.
- Approximate smooth univariate and multivariate functions by their Taylor polynomials and find a bound for the estimation error.

COURSE FORMAT AND STRUCTURE

This course is on-campus. Lectures are on MWF. Recitations are on Thursday

Course Logistics

- When assignments are due, they are due typically by 11:59 pm EST on the due date listed in the course schedule and periodically posted on Canvas.
- Deadlines are an unavoidable part of being a professional, and this course is no exception. Course requirements must be completed and posted or submitted on or before the specified due date and delivery time deadline. Due dates and delivery time deadlines are in Eastern Time (as used in Hoboken, NJ). Please note that students living in distant time zones or overseas must comply with this course time and due date deadline policy. Avoid any inclination to procrastinate. Due dates have been established for each assignment to encourage you to stay on schedule
- Assignments received 1-3 days late will have 10% of the total points deducted; assignments received more than three days late will receive 0 points.

TENTATIVE COURSE SCHEDULE

Please refer to **MA-225-22F1-CourseSchedule.pdf (https://sit.instructure.com/courses/60110/files/10147855?wrap=1)** **(https://sit.instructure.com/courses/60110/files/10147855/download?download_frd=1)** . Please note that this a tentative schedule. I will do my best to keep up with it.

COURSE MATERIALS

Textbook(s):

- Required: OpenStax Calculus (OSC) freely available **here (https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Calculus_(OpenStax))**
- Recommended: “Calculus: Concepts and Contexts, Multivariable” by James Stewart, Fourth Edition,

Other Readings: Notes posted on Canvas

Materials:

- Required: Webassign access. Students can buy the access directly from within the Webassign link posted here on Canvas. They do not need to buy the access to the Ebook. You may buy the homework only access.

COURSE REQUIREMENTS

The work requirements include online assignments, through Webassign, written homework, participation in lectures and ensuing discussions and written quizzes and exams. The goal is to help students acquire a deeper understanding of mathematics, achieve mastery of the most essential calculus skills, and acquire experience in the application of calculus techniques to problems in science and engineering.

Lecture attendance and participation: Lectures are where the main theoretical concepts and techniques are developed and discussed. During the lectures there will be polls and possible clicker questions. We'll be calling students at random to participate in discussions as well. If a student is called during a session and do not respond they will not receive their attendance grade. If clickers are used the participation grade will be based on the correct answers to the question.

Recitations (Problem Sessions): These are problem sessions where students can practice on the problems presented and get additional help with mastering the material from lecture and for asking questions related to the online and written assignments, if they wish. Problem sets will be posted on Canvas the day prior to the recitations, so students have time to work on these problems prior to the recitation. TA's will call students at random to present their solutions to the rest of the class with the assistance of the TA.

Web-Ex Assignments (Webassign): The main goal of these exercises is to develop the routine skills necessary to carry out computations in Calculus. Some of these assignments might include questions on forthcoming material that require independent reading, in which case students will be made aware via the assignment description on Canvas. Students must access Webassign via Canvas.

Written Assignments: There will be 3-4 written homework assignments. These may consist of more complex problems addressing the theoretical or applied aspects of the material. The scans of the assignments in pdf format need to be uploaded to Grade Scope whose link will be avaialble via Canvas before the posted due date.

Quizzes and Exams: There will be two (2), 30-40-minute-long quizzes and one (1) 75-minute-long final exam during the course of the (half)-semester. All quizzes and exams are held during recitation times on Thursday. The tentative dates of these are:

- Quiz 1: Thursday, September 15
- Quiz 2: Thursday, September 29
- Final Exam: Thursday, October 13

The final exam is cumulative.

TECHNOLOGY REQUIREMENTS

- Basic computer and web-browsing skills
- Navigating Canvas

Technology skills necessary for this specific course

- Live web conferencing using Zoom

Required Equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Required Software

- Scanner app
- Pdf reader

GRADING PROCEDURES

Grades will be based on:

Class Attendance and Participation	10%
Written Homework	15%
WebEx Assignments	25%
Quiz 1	10%
Quiz 2	15%
Final Exam	25%

Final Letter Grades will be based on the following grade scale:

A	[90,100]	C+	[72, 75)
A-	[86, 90)	C	[68, 72)
B+	[82, 86)	C-	[65, 68)
B	[78, 82)	D	[60, 65)
B-	[75, 78)	F	[0, 60)

Late Policy

Assignments received 1-3 days late will have 10% of the total points deducted; assignments received more than 3 days late will receive 0 points.

Academic Integrity

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at **http://web.stevens.edu/honor/ (http://web.stevens.edu/honor/)**

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at **www.stevens.edu/honor (http://www.stevens.edu/honor)** .

Graduate Student Code of Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at **www.stevens.edu/provost/graduate-academics (http://www.stevens.edu/provost/graduate-academics)** .

EXAM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Conditions on the quiz or

exam.

1. Students may use the following materials during quizzes and/or exams. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes Conditions: One page, two-sided, letter size, hand-written notes	X	
Typed Notes Conditions: i.e. size of note sheet		X
Textbooks Conditions: i.e. specific books		X
Readings Conditions: i.e. specific documents		X
Other (specify)		X

2. Students are not allowed to work with or talk to other students during quizzes and/or exams.

LEARNING ACCOMMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and

self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit **https://www.stevens.edu/office-disability-services (https://www.stevens.edu/office-disability-services)** . If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at **pgehman@stevens.edu (mailto:pgehman@stevens.edu)** or by phone 201-216-3748.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in

disciplinary actions.

MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). Appointments are can be made by phone (201-216-5177).

EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text “Home” to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at **care@stevens.edu (mailto:care@stevens.edu)** . A member of the CARE Team will respond to your concern as soon as possible.

MA 225 Infinite Series **2022F** ***8/31/2021***

Stewart, "Calculus: Concepts & Contexts," 4e

OpenStax Calculus (OSC)

No.	2022F Date	Topics	Text (OSC)	Due Dates Assignments	Wk
	29-Aug				1
	30-Aug				
	31-Aug				
R1	1-Sep	Calculus 1 Review	9.1		
L1	2-Sep	Intro. and Infinite Sequences	9.1		
NC	5-Sep	***Holiday: Labor Day***			2
	6-Sep				
L2	7-Sep	Infinite Series, Partial sums, Geometric series	9.2		
R2	8-Sep	Practice:		WebEx 1	
L3	9-Sep	Divergence Test, Integral Tests	9.3		
L4	12-Sep	Comparison Tests	9.4	Hw1	3
	13-Sep				
L5	14-Sep	Review for Quiz 1			
Quiz 1	15-Sep	***Review and Quiz 1***		WebEx 2	
L6	16-Sep	The Ratio Test	9.6		
L7	19-Sep	Power series and radius of convergence	10.1		4
	20-Sep				
L8	21-Sep	Manipulating power series	10.2		
R4	22-Sep	Practice		WebEx 3	
L9	23-Sep	Taylor series	10.3	Hw2	
L10	26-Sep	Error bound estimation and applications	10.3		5
	27-Sep				
L11	28-Sep	Review for Quiz 2			
Quiz 2	29-Sep	***Review and Quiz 2***		WebEx 4	
L12	30-Sep	Working with Taylor series	10.4		
L13	3-Oct	Symmetric matrices and quadratic forms	Notes		6
	4-Oct				
L14	5-Oct	Multivariate Taylor series	Notes		
R6	6-Oct	Practice:		WebEx 5	
L15	7-Oct	Optimization and 2nd degree Taylor polynomials	Notes	Hw3	
NC	10-Oct	***No class - Fall Recess***			7
L16	11-Oct	Practice			
L17	12-Oct	Review			
Exam	13-Oct	***Final Exam (cumulative)***		WebEx 6	
NC	14-Oct	*No class*			

WebEx: Through WebAssign due 11:59PM

Hw: Written homework. Upload to Grade Scope, due 11:59PM