

# University of Tennessee

## MATH/COSC 471 Numerical Analysis

Meets: TR 1:10 PM - 2:25 PM

Syllabus Fall 2021

### Welcome to Our Numerical Analysis Class

#### Course Description

**Prerequisites:** Calculus II, ODEs and Matrix Algebra (Math 200, 251 or 257).

**Instructor:** Dr. Wenbo Li

**Office Hours and Location (TBD):** Monday 14:00 pm - 15:30 pm, Thursday 9:50 am - 10:50 am at my office Walters F225 & by appointment. Office hours might be changed after the first class.

**Ways to contact:** wli50@utk.edu, or messages through canvas.

**Course Communications:** I will post course materials (homework, quizzes, exams, video records of class meetings), grades, and class announcements on Canvas. You are always welcome to contact me through email or canvas.

**Back-up zoom meeting link:** <https://tennessee.zoom.us/j/8217664472> . We will use this zoom link in case that we could not meet in the classroom. Meeting through zoom is also a way for discussion if you cannot come to my office hours.

**Student Learning Outcomes:** Upon completion of Math 471, students will be able to

- Approximate functions by polynomials based on a variety of methods
- Compute errors for different methods of numerical differentiation and integration
- Develop and investigate algorithms to solve initial value problems for ODEs
- Apply mathematical theorems to analyze numerical algorithms

**Materials:** I will upload my own notes for this class on canvas. The textbook (optional) for this class is: *Numerical Analysis, 3rd Edition*, Timothy Sauer, Pearson. We plan to cover chapters 0, 3, 5, 6. Another reference (definitely no need to buy) is the book *An Introduction to Numerical Analysis, 1st Edition* by Endre Suli and David Mayers. Chapters 6, 7, 9, 10, 11, and 12 from this book are related to our class.

## Assessment and Evaluations Methods: (no extra points)

*Computational homework (12%) + Quizzes (20%) + Midterm exam (36%) + Final (32%)*

**Computational Homework:** this requires **coding**, and I highly recommend you to use **MATLAB although C/C++ or Python or Fortran is also allowed**. You need to write a short report on the computer including numbers or pictures asked by the assignments, together with your explanations. You are allowed to use the existing code from books or the internet, but you are definitely not allowed to ask other people to do the homework for you. You may discuss the assignments with other students, but copying and pasting other people's answers are not permitted. You are required to submit your code and report on canvas.

**Theoretical Homework:** I will upload theoretical homework on canvas, but will not collect your solutions. Most of the problems come from the textbook mentioned before. The homework would be helpful for your preparation of the quizzes and exams.

**Quizzes:** there will be 5 in-class quizzes. Each quiz is about 20 - 25 minutes at the beginning of the class.

**Midterm:** there will be two in-class midterm exams on Sep 28 and Nov 16.

**Final:** the final covers all the materials in this semester, which will be on Dec 8 (Wednesday) 10:30 am to 12:30 pm. The exam is planned to be an in-class one (might be changed if there is some guidance from the school).

Letter grades will be based on the following scale:

Grade	A	B+	B	C+	C	D+	D	F
%-Score	90+	87-89	80-86	77-79	70-76	67-69	60-66	0-59

I reserve the right to change this scale, provided the change benefits all students. All grades will be made available online.

**Calculators:** The use of a **basic calculator** (addition, subtraction, multiplication, division, exponentiation, and logarithm) as an auxiliary tool is allowed in this class. Advanced calculators that could perform derivative, integration and solving equations are not allowed. Devices with Internet capability such as cellphone calculators are prohibited during the quizzes and exams. To obtain credit, all the steps leading to the solution of a problem must be clearly written.

## Learning Environment and Classroom Expectations/Etiquette:

Everyone is expected to maintain an atmosphere that fosters a positive learning environment.

- Mask wearing is required in the classroom.
- Attendance is mandatory
- Questions are welcomed

**Make Up Policies:** Late homework or quiz submission is not acceptable unless for a valid reason. Make ups for the in-class exams and final will be given only if a student can present evidence that an absence was caused by serious illness, a death in the immediate family, religious observance, or participation in University activities at the request of University authorities. For an illness, you should present a signed statement from a doctor that your illness was sufficiently serious to make you miss class. A note saying only that you visited the doctor or the Health Center may not Suffice. Furthermore, please let me know before the exam or the deadline if you cannot make it.

## [Campus Syllabus](#)

**COVID Guidelines:** Students, faculty, and staff will be required to wear masks in classrooms and labs, and for indoor academic events required for students such as orientation. We will continually re-evaluate the need for masks based on COVID-19 case counts in our community.

The best way to take care of ourselves and one another and to beat this virus is to get vaccinated. Vaccines are safe, free, and effective. With the highly transmissible Delta variant now in our community, if you are not vaccinated you are at greater risk of getting sick than you were last year on campus. More information about vaccines, including a vaccination event at Neyland Stadium, [is available on the UT website](#).

## **STUDENTS WITH DISABILITIES -- <http://sds.utk.edu>**

“Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Student Disability Services (SDS) at 865-974-6087 in 100 Dunford Hall to document their eligibility for services. Student Disability Services will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities.”

## **ACADEMIC INTEGRITY**

Each student is responsible for his/her personal integrity in academic life and for adhering to UT’s Honor Statement. The Honor Statement reads: “An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

## **How to be Successful in this Course:**

- Take notes and ask questions.
- Think, work smarter and discuss with classmates.
- Review and rework problems that you got wrong.
- Start preparing for exams early.

If the instructor finds it necessary to make informational changes (e.g. office hours, schedule adjustments) due to students' needs or unforeseen circumstances, students will be notified in writing/email of any such changes.

## Key Dates - Fall 2021: [UT Calendar](#)

### Math 471 Projected Schedule Fall 2021

	Section numbers, topics	Homework and Quiz Information
8/19	Introduction of the course materials, Sections 0.1, 0.2, 0.3	
8/24	Sections 0.3, 0.4	
8/26	Section 3.1	
8/31	Section 3.1	
9/2	Section 3.2	
9/7	Section 3.3	<b>Quiz 1</b>
9/9	Section 3.1' Hermite interpolation	
9/14	Section 3.4	
9/16	Sections 3.4, 3.5	
9/21	Section 5.1	<b>Quiz 2</b>
9/23	Section 5.1	
9/28	<b>Midterm exam 1</b>	
9/30	<b>Fall Break</b>	
10/5	Section 5.2	
10/7	Section 5.2	
10/12	Sections 5.2, 5.3	
10/14	Sections 5.3, 5.4	
10/19	Section 5.5	<b>Quiz 3</b>
10/21	Section 5.5	
10/26	More on numerical integration	
10/28	Sections 6.1 (briefly), 6.2	
11/2	Section 6.2	<b>Quiz 4</b>
11/4	Sections 6.2, 6.3	
11/9	Sections 6.3, 6.4	
11/11	Section 6.4	
11/16	<b>Midterm exam 2</b>	
11/18	Section 6.5	
11/23	Section 6.6, implicit method and stability	<b>Quiz 5</b>
11/25	<b>Thanksgiving</b>	

<b>11/30</b>	Review	
<b>12/8</b> <b>Wed</b>	<b>Final</b> <b>Exam</b>	<b>10:30 am to 12:30 pm</b> <b>GOOD LUCK!!!</b>