# MTH/CSI 4322 SYLLABUS

∽ *NUMERICAL ANALYSIS* ∽

**Spring 2024**

## ↬ Section 01: TTh 09:30 AM–10:45 AM, Sid Richardson 324

**Instructor:** Professor Qin "Tim" Sheng
**Office Hours:** TTh 2:00-3:30 pm (confirmed)
**Office Location:** Sid Richardson 302.F
**Office Phone:** 254-710-1241
**E-Mail:** Qin_Sheng@Baylor.edu
**URL:** http://sites.baylor.edu/qin_sheng/

**TEXTS:**

- *Numerical Analysis* (10th Ed.) by Richard L. Burden, J. Douglas Faires, Annette M. Burden

**COURSE DESCRIPTION:** This is a general numerical analysis course at the entrance level. Materials to be studied in the course include number representation and errors, numerical linear algebra, basic approximation theory and methods, linear and nonlinear systems, and numerical integration. Topics in the latest research will be introduced to broad views of the students. Students are expected to build their interests, solid foundation and to govern the basic concepts, theory and methods in numerical computations by the end of the course. They are expected to possess the ability in understanding practical problems in the correct ways and to develop new computational methods for solving various problems after this study. Computer programming skills are not required in the beginning of this course. But they are expected to be built through this course. My latest lecture notes will also be used.

**OUTLINE OF THE TENTATIVE TOPICS:**

1. *Preliminaries:* error definitions and floating-point numbers, review of advanced calculus.
2. *Detailed number representations and errors:* different bases, floating-point arithmetic.
3. *Numerical solution of nonlinear equations:* bisection method, Newton's method, secant method.
4. *Basic approximation skills and numerical differentiation:* polynomial interpolations, error and controls, Richardson extrapolation, recent trends and advances.
5. *Numerical integration:* definite integral, trapezoid rule, adaptive methods, Gaussian quadratures, recent trends and advances.
6. *Basic numerical methods for solving ordinary differential equations.*
7. *Systems of linear equations:* direct and iterative methods, basic matrix properties, recent trends and advances.

**HOMEWORK:** As we go along section by section for the covered materials in the textbook, students are required to complete suggested exercises in time. You are required to keep a notebook solely for this homework. If you have questions please see me either during my office hours or by making an appointment. Homework will not be collected or graded directly.

**PROJECT ASSIGNMENTS, QUIZZES AND GRADING POLICIES:** Multiple in-semester quizzes, one midterm project and one final exam will be required.

See following tentative quiz, project assignment and exam schedule:

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| *Preview* | 01/16 | Quiz 4 | 02/13 | Quiz 7 | 03/19 | Quiz 9 | 04/16 |
| Quiz 1 | 01/23 | Quiz 5 | 02/20 | Quiz 8 | 03/26 | Quiz 10 | 04/23 |
| Quiz 2 | 01/30 | **Flexible** | 02/27 | **Proj Due Day** | 04/02 | | |
| Quiz 3 | 02/06 | Quiz 6 | 03/12 | *Eclipse* | 04/09 | **Final Ex.** | 05/04 |

↪ **FINAL EXAM INFORMATION:** Saturday, May 4, 2024, 09:00–11:00 am
↪ Website: https://registrar.web.baylor.edu/exams-grading/spring-2024-final-exam-schedule

The Method of Evaluation (tentatively) is:

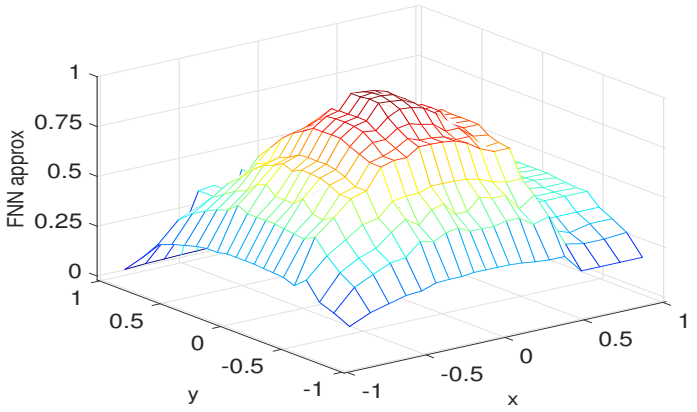
multiple quizzes, 35%
1 midterm project, 30%
1 final exam, 35%

**MATH LAB and TUTORING:** Sid Richardson 326, Monday-Friday, 3:15 pm – 5:15 pm (please scan the QR code near the door of Sid Richardson 326 to sign in each time you visit)

**FINAL EXAM SCHEDULE:** TBA.

*Grading Scale:* 91-100 A; 89-90 A-; 87-88 B+; 81-86 B; 79-80 B-; 77-78 C+; 71-76 C; 69-70 C-; 67-68 D+; 61-66 D; 59-60 D-; Lower F.

**ACCESSING CLASS INFORMATION VIA INTERNET:** The standard syllabus, and classroom notes/announcements/quizzes/final exam and help links will be posed on *Canvas*.




A PDE Solution Recovered via a Feedforward Neural Network

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**Academic Success:** I believe every student who has been admitted to Baylor can be successful and I want to partner with you to help you thrive academically. Be sure to take advantage of the many resources available for academic success, including coming to see me during my office

hours. Students who regularly utilize the great resources in the Paul L. Foster Success Center (http://www.baylor.edu/successcenter/) are among my most successful students. If your academic performance in this class is substandard, I will submit an Academic Progress Report to the Success Center so that the team of coordinated care professionals can ensure that you get the help you need.

**First Generation College Students:** Baylor University defines a first-generation college student as a student whose parents did not complete a four-year college degree. The First in Line program at Baylor is a support office on campus for first-generation college students to utilize if they have any questions or concerns. Please contact First in Line at firstinline@baylor.edu, call 254-710-6854, or visit www.baylor.edu/firstinline to learn more about the services available. *[If you are a first gen college student, you may wish to add:] I was also the first in my family to graduate with a four-year bachelor?s degree and can answer questions about experiences as a first-generation college student.*

**Military Student Advisory:** Veterans and active duty military personnel are welcomed and encouraged to communicate, in advance if possible, any special circumstances (e.g., upcoming deployment, drill requirements, disability accommodations). You are also encouraged to visit the VETS Program Office with any questions at (254) 710-7264.

**Office Hours:** TBA.

**Academic Integrity:** Plagiarism or any form of cheating involves a breach of student-teacher trust. This means that any work submitted under your name is expected to be your own, neither composed by anyone else as a whole or in part, nor handed over to another person for complete or partial revision. Be sure to document all ideas that are not your own. Instances of plagiarism or any other act of academic dishonesty will be reported to the Honor Council and may result in failure of the course. Not understanding plagiarism is not an excuse. As a Baylor student, I expect you to be intimately familiar with the Honor Code at: http://www.baylor.edu/honorcode/

**Students Needing Accommodations:** Any student who needs academic accommodations related to a documented disability should inform me immediately at the beginning of the semester. You are required to obtain appropriate documentation and information regarding accommodations from the Office of Access and Learning Accommodation (OALA). Contact Information: (254) 710-3605 – Paul L. Foster Success Center, 1st floor on the East Wing of Sid Richardson.

**Title IX Office – Title IX Coordinator:**

*Sexual and Gender-Based Harassment and Interpersonal Violence Policy*

Baylor University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities, and it does not tolerate discrimination or harassment on the basis of sex or gender. This policy prohibits sexual and gender-based harassment, sexual assault, sexual exploitation, stalking, intimate partner violence, and retaliation (collectively referred to as prohibited conduct). For more information on how to report, or to learn more about our policy and process, please visit www.baylor.edu/titleix. You may also contact the Title IX office directly by phone, (254) 710-8454, or email, TitleIX_Coordinator@baylor.edu.

Except for Confidential Resources, all University Employees are designated Responsible Employees and thereby mandatory reporters of potential Title IX violations. Confidential Resources who do not have to report to Title IX include those working in the Counseling Center, Health Center and the University Chaplain, Dr. Burt Burleson.

The Title IX office understands the sensitive nature of these situations and can provide infor-

mation about available on- and off-campus resources, such as counseling and psychological services, medical treatment, academic support, university housing, and other forms of assistance that may be available. Staff members at the office can also explain your rights and procedural options if you contact the Title IX Office. You will not be required to share your experience.

**If you or someone you know feels unsafe or may be in imminent danger, please call the Baylor Police Department (254-710-2222) or Waco Police Department (9-1-1) immediately.**