

Math 311: Introduction to Numerical Methods

Winter 2026

Class meeting: M, W, F 12 - 12:50 PM at SCB 303.

Instructor: Dr. Tuan Pham

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Office: SCB 316, telephone: 808-675-3044

Office hours: M, W, F 2:00 - 3:30 PM or by appointment

Canvas: <https://byuh.instructure.com/courses/1483089>

Course website: <https://web.engr.oregonstate.edu/~phamt3/Courses/W26-Math-311>

Prerequisite: Math 213

Credit hours: This 3-credit hour course approximates one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately 14 weeks.

Textbooks: “*Numerical Methods*” by S.R.K. Iyengar and R.K. Jain, 2009. The book is accessible electronically through BYUH Library: <https://byuh.on.worldcat.org/oclc/430956421>.

Course description: This course covers interpolation, curve fitting, numerical differentiation and integration, and numerical solutions to linear, non-linear and differential systems.

Learning Outcomes: Upon successful completion of this class, a student will be able to:

1. Develop proficiency in understanding problems and proofs within the context of numerical methods;
2. Expand content knowledge by learning key definitions and theorems, which are essential to understanding calculus and its role in the development of mathematical knowledge;
3. Apply numerical methods to a variety of problems throughout the course, enhancing problem-solving skills;
4. Write solutions in a logical and cohesive manner, as well as effectively communicate oral explanations;
5. Gain proficiency in using calculators and desktop software for writing mathematics, which will aid in solving problems and presenting solutions;
6. Program with Matlab to solve numerically the solutions and visualize them.

Course goals: The Math Department has established eight outcomes for graduating mathematics majors. The table below indicates which outcomes will be addressed in Math 311.

Program L.O.	Where/When addressed	Institutional L.O.
Demonstrate proficiency in Algebra and Trigonometry necessary for success in Advanced mathematical studies. [low priority]	Some homework problems and exams require the use of algebra and trigonometry and proofs	Knowledge, Analysis
Demonstrate proficiency in Differential, Integral, and Multivariable Calculus necessary for success in Advanced mathematical studies. [medium priority]	Some homework problems and exams require the use of calculus and multivariable calculus concepts	Knowledge, Analysis
Demonstrate content knowledge of both abstract and applied mathematical disciplines by stating definitions, salient theorems, and proofs of major theorems and concepts that are core content in upper division courses. [medium priority]	Learning and applying definitions and theorems associated with Linear Algebra will be expected throughout the course	Knowledge, Inquiry, Analysis
Organize and explain their knowledge of logic and mathematical content in the structure of original valid proofs. [low priority]	Proofs will be expected on class exams and homework assignments	Analysis, Communication
Communicate mathematical ideas effectively in both written and oral context. [high priority]	The course will have some focus on written proofs on exams. Students will discuss problems orally in the classroom setting.	Communication
Apply major definitions, theorems and algorithms in problem solving. [high priority]	Students will focus on applications of linear algebra.	Knowledge, Analysis
Use appropriate technological tools while solving mathematical problems. [high priority]	Application of computer and/or calculators for solving systems of equations and reducing matrices will be particularly important in the course.	Knowledge, Analysis
Prepare professionally for graduate school or employment in mathematics or related fields. [high priority]	This is an introductory upper division course building skills which are particularly useful in mathematics related fields.	Inquiry, Service, Stewardship

Course goals: By the end of the course, your mathematical reasoning skills and programming skill will be increased and you will begin to understand how to approach and solve problems. Mathematics also promotes the development of critical thinking and logic.

Grading components:

Homework: 25%

Participation: 15%

Quizzes: 15%

Midterm 1 & 2: 15% each

Final exam: 15%

There will be opportunities for extra credit during the course.

Evaluation:

- **Homework:** homework are to be turned in on paper at the beginning of the class on the day it is due. Most homework set has one or more problems that require Matlab programming. These problems are to help you understand algorithms and implementing them on the computer.

- **Participation:** starting on Jan 21, the instructor will check attendance every day of class. Besides attendance, you participate in the class by asking questions or answering questions from the instructor or classmates. You get a participation score for every class.
- **Quizzes:** quizzes will be given in class (see class schedule) at a random time. These quizzes are to test students' understanding of recent topics.
- **Exams:** this class has three exams, all taking place in the regular classroom SCB 303.
 - Midterm 1: Wednesday, Feb 11, 2026 from 10 - 10:50 AM.
 - Midterm 2: Wednesday, Mar 18, 2026 from 10 - 10:50 AM.
 - Final exam: Wednesday, Apr 15, 2026 from 2 - 4 PM.

Make-up work and due-date extension: Extension of due dates for assignments will be given only in exceptional circumstances, with appropriate documentation, such as illness or family emergency. If possible, notify the professor as soon as you are aware of the issue.

Use of Artificial Intelligence (AI): in this course, the use of AI tools is permitted only under the following condition:

- While working on homework, you may use AI to find more examples in addition to the examples given in class to help you better understand the method taught in class. However, you must write the homework yourself instead of having AI write the homework for you. You must use the method taught in class for your homework.
- While working on labs, you may use AI to assist you with the coding. However, you must use the coding techniques shown in the lab instruction.

Grade lines: the course grade lines will not be harder than the standard grade lines: A 100-93%, A- 92.99-90%, B+ 89.99-87%, B 86.99-83%, B- 82.99-80%, C+ 79.99 - 77%, C 76.99-73%, C- 72.99-70%, D+ 69.99-67%, D 66.99-63%, D- 62.99 - 60% and F < 60%.

Other Learning Resources:

- The instructor has office hours dedicated to help you. Don't hesitate to make an appointment if the office hours conflict with your schedule.
- Your fellow classmates are also a good resource. Form a study group and you will find it helpful.
- You can find peer tutors at the Math Lab, located in SCB 302. Online tutoring is also available. Check out their hours here: <https://mc.byuh.edu/math-lab>.

Student Academic Grievance policy:

Students, who feel that their work has been unfairly or inadequately evaluated by an instructor, are encouraged to pursue the matter as an Academic Grievance by following the steps found in the Academic Grievance policy at <https://catalog.byuh.edu/policies-procedures/grievances>.

Final Exam Schedules: Final exams are to be offered on the specific day and time as determined by the official final exam schedule. Students must plan travel, family visits, etc., in a way that will not interfere with their final exams. Less expensive air fares, more convenient travel arrangements, family events or activities, and any other non-emergency reasons are not considered justification for early or late final exams.

Honor Code: The Honor Code exists to provide an education in an atmosphere consistent with the ideals and principles of the Church of Jesus Christ of Latter-day Saints. Students, faculty and staff are expected to maintain the highest standards of honor, integrity, morality, and consideration of others in personal behavior. Academic honesty and dress and grooming standards are to be maintained at all times on and off campus. For specific information see <http://honorcode.bryuh.edu>.

Discrimination: The University is committed to a policy of nondiscrimination on the basis of race, color, sex, pregnancy, religion, national origin, age, disability, genetic information or veteran status in admissions, employment or in any of its educational programs or activities. For specific information see the non-discrimination policy at <https://policies.bryuh.edu>.

Title IX and Sexual Misconduct: The University will not tolerate any actions proscribed under Title IX legislation, specifically sexual harassment, sexual violence, domestic or dating violence or stalking perpetrated by or against any university students, university employees or participants in university programs. For specific information see <https://titleix.bryuh.edu>. All faculty and staff are deemed responsible reporting parties and as such mandated to report incidents of sexual misconduct including sexual assault to the Title IX.

Title IX Office
Lorenzo Snow Administrative Building
55-220 Kulanui St.
Laie, HI 96762
Office Phone: (808) 675-4585
E-Mail: titleix@bryuh.edu

Accommodating Students with Disabilities: Disability Services is dedicated to assisting students with disabilities by providing opportunities for success and equal access at Brigham Young University-Hawaii. We are committed to coordinating reasonable accommodations as outlined by Federal and State law. To learn more about available supports, go to <https://disability.bryuh.edu>, call (808) 675-3518 or go to McKay Building 181 across from the Cafeteria. You may also email disabilityservices@bryuh.edu with questions.

Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily life. If you or someone you know is experiencing mental health challenges at BYUH, please contact Counseling Services at (808) 675-3518. Services are free and confidential. For more information, visit <https://counseling.bryuh.edu/>. Free mental health self-help resources are available through TAO Connect. To access them, simply go to <https://us.taoconnect.org/register> and sign in using your BYUH email address. In a crisis situation, or after hours, please contact BYUH Campus Safety at (808) 675-3911 or call 911 if you are off campus. You can also call the 24-hour crisis hotline at 1-800-753-6879 or contact the Crisis Text Line at 741-741.

Report a Concern: If you have a concern to report go to <http://about.bryuh.edu/reporta concern>. If you have reason to believe a student or dependent of a student is a danger to self or others please do one of the following depending on the urgency of the situation:

- a. Call 911,
- b. Call BYU-H Public Safety (675-3911),
- c. Report a concern to the Behavior Intervention Team.