

# Math 301: Foundations of Mathematics

Spring 2025 – Section 1

**Class meeting:** M, W, F 11:00 - 12:20 at SCB 303.

**Instructor:** Dr. Tuan Pham

**Email:** tpham@byuh.edu

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

**Office hours:** M, W, F 12:30-2:00 PM or by appointment

**Canvas:** <https://byuh.instructure.com/courses/1481292>

**Course website:** <https://web.engr.oregonstate.edu/~phamt3/Courses/S25-Math-301>

**Prerequisite:** Math 212

**Credit hours:** This -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 8 weeks.

**Textbook:** “*PLP: An Introduction to Mathematical Proof*” (version August 15, 2023), by Demirbaş and Rechnitzer. The Math Department has physical copies which you can borrow for the entire the semester.

**Course description:** This course is an exploration of mathematical logic, set theory, proof techniques, development of number systems, axiomatic systems, and the contribution of famous mathematicians.

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

1. Develop the skill of organizing and writing original proofs using basic proof techniques such as direct proof, proof by contrapositive, proof by contradiction, proof by induction;
2. Write solutions and provide oral explanations in a logical and cohesive manner;
3. Learn and apply essential knowledge of Calculus I and Modular Arithmetics to develop proofs;
4. Present examples to others to help them understand concepts and definitions;
5. Write math with LaTeX;
6. Gain an understanding of the history of mathematics and the contributions of famous mathematicians.

**Course goals:** By the end of the course, your reasoning, writing, oral communication skills will be increased. The math department has established eight outcomes for graduating majors. The table below indicates which outcomes will be addressed in Math 301.

Program L.O.	Student L.O.	Institutional L.O.
Demonstrate proficiency in Algebra and Trigonometry necessary for success in Advanced mathematical studies. [low priority]	Students need this proficiency to understand problems and proofs, and do develop problem solving skills	Knowledge, Analysis
Demonstrate proficiency in Differential, Integral, and Multivariable Calculus necessary for success in Advanced mathematical studies. [low priority]	Techniques of integration, Differential Equations is the basis of this course and is the main component of it.	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]	Content knowledge will be expanded; definitions and theorems are key to understanding calculus and how they help us develop a living knowledge of mathematics.	Knowledge, Inquiry, Analysis
Organize and explain their knowledge of logic and mathematical content in the structure of original valid proofs. [high priority]	Proofs will be demonstrated by the instructor and examples will be presented in the book. Original proofs required of the student will be minimal.	Analysis, Communication
Communicate mathematical ideas effectively in both written and oral context. [high priority]	Students must be able to write solutions in a logical and cohesive manner; likewise, oral explanations are very important for the successful student.	Knowledge, Communication
Apply major definitions, theorems and algorithms in problem solving. [low priority]	Application problems appear in many chapters in calculus.	Knowledge, Analysis
Use appropriate technological tools while solving mathematical problems. [low priority]	Students will gain a good knowledge of calculator use and computers to aid them in solving problems.	Knowledge, Analysis
Prepare professionally for graduate school or employment in mathematics or related fields. [medium priority]	Applications of calculus are discussed throughout the course.	Knowledge, Inquiry, Service, Stewardship

### Grading components:

Homework: 20%

Attendance: 10%

Quizzes: 15%

Write math with LaTeX: 10%

Oral presentation: 10%

Midterm: 15%

Final exam: 20%

There will be opportunities for extra credit during the course.

### Evaluation:

- **Homework:** homework will be graded on the basis of completion. For example, if you show any meaningful attempts on 4 problems out of 5 problems assigned, you will get 80% regardless of whether your solution is correct or not. You will be given feedback on some problems.

- **Attendance:** after the deadline for dropping the class, the instructor will check attendance every day of class.
- **Quizzes:** quizzes will be given in class on each Wednesday. These quizzes are to test your understanding of recent topics.
- **Write math with LaTeX:** LaTeX is a widely-used markup language for high-quality technical typesetting. Most people in the scientific world use LaTeX to typeset papers, exams, books, and more. When your homework is returned, you will be asked to type certain problems using LaTeX.
- **Oral presentation:** you will present to the class the problem(s) that you were asked to type. These oral presentations are to help you develop your mathematical communication skills.
- **Exams:** there will be one midterm exam and one final exam. Each exam will be done in class. The final exam will be from **1:00 - 3:50 PM on Friday, June 27, 2025** at the regular classroom (SCB 303).

**Use of Artificial Intelligence (AI):** in this course, the use of AI tools for learning is permitted. However, you must not have AI write homework solutions for you or type math with LaTeX for you. These practices are considered as cheating and you may receive a score of zero.

**Make-up work and due-date extension:** make-up exams 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. Extension of due dates for assignments may be considered under similar conditions.

**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.byuh.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.byuh.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.byuh.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@byuh.edu](mailto:titleix@byuh.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.byuh.edu>, call (808) 675-3518 or go to McKay Building 181 across from the Cafeteria. You may also email [disabilityservices@byuh.edu](mailto:disabilityservices@byuh.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.byuh.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.byuh.edu/reportaconcern>. 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.