UW Bothell School of Science, Technology, Engineering, and Mathematics

STMATH 300A (Foundations of Modern Mathematics)	**Spring 2018**
Instructor: Dr. Thomas Humphries	SLN# 19879
Email: thumphri@uw.edu	Course Time: TTh 8:45 – 10:45
Office Hours: TW 3:30 – 4:30	Course location: UW2 240
Office Hours location: DISC 352K	Credits: 5

Course Description: Introduces students to mathematical argument and to reading and writing proofs. Develops elementary set theory, examples of relations, functions and operations on functions, the principle of induction, counting techniques, elementary number theory, and combinatorics. Places strong emphasis on methods and practice of problem solving. Prerequisite: minimum grade of 2.0 in STMATH 125, or MATH 125.

Course Learning Goals:
At the end of this course, students will be able to:

- Write complete, correct, and coherent proofs using direct methods, indirect methods, and mathematical induction.
- Apply fundamental mathematical concepts – including logic, techniques of proof, set theory, relations, functions, and binary operations – to solve mathematical problems.

Communication Preferences: Regular office hours are Tuesdays and Wednesdays, 3:30 – 4:30, in DISC 352K. For those who are not able to make it to the regular office hours, I may also be available at other times, but please e-mail me ahead of time to make an appointment.
Please take advantage of office hours! These are your best resource if you are struggling with the course material, or even just need a hint on a problem that is giving you trouble. I am always open to talk with students and to help get you pointed in the right direction.
Please send e-mail related to the course from your university e-mail address or through Canvas. Please include your name and student number in any new e-mail correspondence. From Monday to Friday I do my best to reply to e-mails within 24 hours. On weekends I cannot guarantee a prompt reply.

Course Website: All class information, announcements, assignments, solutions and grades will be posted on Canvas. If possible, I will upload a .pdf of the day's course notes after every lecture (under Files) as well as a recording of the lecture under Panopto Recordings. ***Do not take this as a license to skip class!*** Regular attendance is vital to getting a good grade in the course.

Course Text: A .pdf of the course text, *Foundations of Mathematics*, is available on Canvas.

Grading Criteria: Take-home quizzes (5%), Assignments (30%), two midterm tests (35% total) and one comprehensive final (30%). Your percent grade (out of 100) will be converted to GPA (out of 4.0) using the following formula:

- **4.0** if your percent grade is higher than 95.
- **$2.0 + 0.08 \times (p-70)$**, rounded to the nearest tenth, if your percent grade (p) is between 70 and 95. This means that 70% equates to 2.0, 80% equates to 2.8, and 90% equates to 3.6, with other values falling in between.
- **$0.7 + 0.1 \times (p-57)$** if your percent grade (p) is between 57 and 70.
- **0** if your percent grade is below 57.

Quizzes

- Short take-home quizzes will be assigned at the end of most classes. They will be self-graded at the start of class the following day.
- Each quiz is worth 0.5% of your final grade, up to a maximum of 5 points. As long as you have completed at least 10 quizzes over the course of the quarter, you should get full marks for your quiz score.

Assignments

- There will be a total of seven assignments. Your best five assignments will be worth 5% of your final grade each, while the lowest two are each worth 2.5%.
- Assignments are due by **5:00 pm** on Thursdays. You may turn them in at the end of class, or by stopping by my office before 5:00 pm. If I am not in the office, please leave it with the office staff at the front desk.
  In general I will not grant individual extensions on assignments. If there is a legitimate reason that you are not able to submit the assignment in person on the due date (illness, etc.) then you must get in touch with me as soon as possible to make arrangements. This may include submitting your assignment via e-mail.
- Your name, student ID, and the assignment number must be written on the first page of the assignment. Please make an effort to present your work clearly. Points may be deducted for poor presentation, including work that is difficult for the grader to follow, messy writing, or torn pages.
- It is acknowledged that students may discuss assignment problems with one another. However, students **must** write up their own solutions without checking over their solution with another student. ***Under no circumstances should you copy another student's solution, allow another student to look over your solutions, or try to find solutions to a problem online.*** Failure to comply with this policy will result in a mandatory meeting with the course instructor and the possibility of further consequences, at the instructor's discretion. For more information, please see the Academic Integrity section in the list of STEM Classroom Policies below.

Tests and Exam:

- There will be two midterm tests over the course of the semester. The second midterm will not be cumulative. The better of the two tests counts 20% towards your final grade, while the lesser counts 15%. Both tests will take place in class.
- The final exam is cumulative and takes place on Thursday, June 7 in our regular room and class time. It is worth 30% of your final grade and will be 2 hours long.
- Tests are closed-book – no notes, textbooks, or electronic aids are permitted.

Religious observances: UW Bothell makes every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. ***Students should notify faculty at least three weeks in advance of a need to be excused from a class, an exam, or other scheduled academic activity to observe a religious holiday of their faith.*** Students should make arrangements with faculty in advance to make up the exam, class material or activities covered in their absence, including agreements for alternate exam options.

List of classroom policies: A list of common classroom policies for the School of STEM, including Academic Honesty, Access and Accommodations for students with disabilities, and Student Support Services, is provided at http://bit.ly/STEMclassroom_policies
You are expected to be familiar with all of these policies! Please take the time to read through them.

Course Schedule

	Day	Material	Notes
Week 1	Tues Mar 27	§0.1 Introduction to proofs	
	Thurs Mar 29	§0.2 – 0.4 Basic number theory	
Week 2	Tues Apr 3	§1.1 – 1.2 Propositional logic	
	Thurs Apr 5	§1.3 – 1.4 More propositional logic	Assignment #1 due
Week 3	Tues Apr 10	§1.5 Techniques of proof	
	Thurs Apr 12	§6.2 Mathematical induction	Assignment #2 due
Week 4	Tues Apr 17	§2.1 – 2.2 Introduction to sets	
	Thurs Apr 19	§2.2 – 2.3 Set combinations & Venn diagrams	Assignment #3 due
Week 5	Tues Apr 24	§2.3 – 2.4 Cartesian product, set indexing	
	Thurs Apr 26	n/a	Midterm test #1
Week 6	Tues May 1	§3.1 Relations	
	Thurs May 3	§3.2—3.3 Equivalence relations	Assignment #4 due
Week 7	Tues May 8	§3.3 – 3.4 Relation properties and ordering	
	Thurs May 10	§4.1 – 4.2 Functions	Assignment #5 due
Week 8	Tues May 15	§4.2—4.3 Properties of functions, composition	
	Thurs May 17	§4.3—4.4 More properties of functions	Assignment #6 due
Week 9	Tues May 22	§5.1 Binary operations	
	Thurs May 24	n/a	Midterm test #2
Week 10	Tues May 29	§5.2 Properties of binary operations	
	Thurs May 31	§6.1 Properties of integers	Assignment #7 due
Finals week	Thurs June 7	n/a	Final Exam