City of Seattle Upward Bound @ Seattle University, Summer 2018

Course: Survey of Higher Mathematics   **Teacher: Alex V. Thayer**

Website: *alexthayer.net/ub/surv/* **E-Mail: alex.thayer@seattle.gov**

Course Summary:

- This six-week independent study course is designed to teach improve the student's understanding of single and multivariable calculus as well as introduce linear algebra, differential equations, and other topics.

- Proofs will play a significant role in this course, as the student will be expected to show complete work when answering questions.

Resources:

- *Calculus* (11th ed), Cengage Learning, Larson & Edwards, 2017.
- *Elementary Differential Equations and Boundary Value Problems* (11th ed), Wiley, Boyce, DiPrima, & Meade, 2017.
- *Linear Algebra and Its Applications* (5th ed), Pearson, Lay, Lay, & McDonald, 2015.
- *Proofs and Fundamentals: A First Course in Abstract Mathematics* (2nd ed), Undergraduate Texts in Mathmeatics, Springer, Bloch, 2011.
- khanacademy.org
- math.com
- tutorial.math.lamar.edu

Structure of Daily Lessons:

- For this course, the student may sometimes need a device with internet access to view online materials. If the student does not have access, please inform me, and I will seek to provide it.

- Each day, the student will be assigned classwork in the form of either a printed worksheet, a link to a website, or some hybrid of the two. This work should be turned in at the end of the class period. I will review the work and write feedback which the student will receive the following class day.

- If work is not completed during class, it can either be completed outside of class or (with approval of the instructor) the work may continue the next class day.

- A list of assigned classwork, past quiz questions and answers, and any other relevant files will be posted at *alexthayer.net/ub/surv/* for the student's reference.

Tentative Weekly Outline:

- **Week 1**
  - The Basics of Proofs
- **Week 2**
  - Single Variable Calculus Review
  - Epsilon-Delta Proofs
- **Week 3**
  - Multi-variable Calculus Review
  - Differential Equations Introduction
- **Week 4**
  - Abstract Algebra Introduction
  - Linear Algebra Introduction
- **Week 5**
  - More Linear Algebra
- **Week 6**
  - Other Branches of Mathematics
  - Final Project

Grading System:

- **Daily Lessons (25%)**
  - You are expected to turn in your assigned classwork each day. If you are unable to complete the assignment, please turn in what you have completed by the end of class.
  - If you are having trouble understanding the assigned worksheet or online material, please let me know, and I will assist. If you have further questions beyond what I can answer in class, remember you can contact me via e-mail at *alex.thayer@seattle.gov*.
  - Although I will mark incorrect problems and provide feedback, grading of lessons is only done on a "completion" basis. You receive 2 of 2 points for work completed in a timely manner and 1 of 2 points for work over a day late.
- **Participation (25%)**
  - Since this class is run mostly as an independent study, you are expected to be proactive in working on the assigned problems and reading the parts of each chapter which you'll need to answer those problems.
  - Assuming you are on-task the entire period, that is an easy 2 of 2 points each day. If you are off-task or disruptive toward other students, you may lose 1 or both points.
- **Quizzes (25%)**
  - There will be several short quizzes throughout the summer. They will be taken during the first 10 minutes of class, so please arrive on-time every day.
  - Each quiz will consist of only 2 questions: a concept question and an example.
  - For the concept question, you will be asked to give a mathematically accurate explanation for how something works. For example, "explain how to calculate the standard deviation of a list of numbers". This question will be worth 4 points.

- o The example question is more like a traditional math problem, and it will relate to what you were asked to explain in the concept question. It will be worth 6 points.
- o If you would like to re-take a quiz, please let me know. You may arrange to re-take it on another date (as long as we don't have another quiz scheduled for that date). Example problems will be different from originals on re-takes.
- **Culminating Project (25%)**
  - o The culminating project for this course will be to lead a 20-minute lesson on the topic of your choice (subject to my approval).
  - o You will give this lesson during the final week of class to your fellow students going into Calculus, so please make it accessible to students at their level.
  - o You must create at least 1 handout to go along with your presentation. This handout will be given to each student and staff member attending your lesson.
  - o We will use a computer lab for 1-2 class periods toward the end of the summer so that you may type your handout, lesson notes, or anything else you need for your project.

Your final average will be rounded to the nearest integer percentage and assigned a letter grade according to the following scale:

	A = 93 – 100	A- = 90 – 92
B+ = 87 – 89	B = 83 – 86	B- = 80 – 82
C+ = 77 – 79	C = 73 – 76	C- = 70 – 72
D+ = 67 – 69	D = 63 – 66	D- = 60 – 62
	F = 0 – 59	

Homework:

As mentioned above in the Grading System, there is nothing specifically called "Homework", but you are expected to complete the assigned problems, be proactive during class, prepare yourself for quizzes, and complete and present your final project.

Absences and Late Assignments:

If you are absent, you must be given the same number of days you were gone from school to turn in missing work for full credit. Assignments completed later than this time must be accepted at 50% credit. If you missed or expect to be missing class, I encourage you to contact me by e-mail and check the website for any new files.