



**DOANE**  
UNIVERSITY

## **MATH 108 Course Syllabus**

### **Course Information**

MATH 108 - Modeling & Applications  
Summer Term (May 20, 2019 - July 20, 2019)  
3 Credit Hours

### **Instructor Information**

Dr. Darla Berks  
Doane University

### **Contact Information**

Email Address: [darla.berks@doane.edu](mailto:darla.berks@doane.edu)  
Office Hours: varies; contact instructor to arrange

### **Communicating With the Instructor**

This course uses a “three before me” policy for student to faculty communications. When questions arise during the course of this class, please remember to check these three sources for an answer before asking me to reply to your individual questions:

1. Course syllabus
2. Announcements in Blackboard
3. The Q & A discussion board

This policy will help you in potentially identifying answers before I can get back to you and it also helps your instructor avoid answering similar questions or concerns multiple times.

If you cannot find an answer to your question, please first post your question to the Q & A discussion board. Here your question can be answered for the benefit of all students by either your fellow students who know the answer to your question or the instructor. You are encouraged to answer questions from other students in the discussion forum when you know the answer to a question in order to help provide timely assistance.

If you have questions of a personal nature such as relating a personal emergency, questioning a grade on an assignment, or something else that needs to be communicated privately, you are welcome to contact me via email. I will usually respond to email quickly, but please allow 24 hours for me to respond. You will receive frequent feedback throughout

the course. If you ever have any questions about your progress in the course, please don't hesitate to contact me.

If you have a question about the technology being used in the course, please contact the Doane University Help Desk for assistance (contact information is listed below ).

## Course Catalog Description

This is an algebra-based course with an emphasis on practical applications. An examination of real-life models and their applications using algebra as a foundation. Students successfully completing this course will effectively use algebra and technology to analyze models of real-world phenomena; effectively read, interpret and analyze problems; and gain quantitative literacy and confidence.

## Course Prerequisites

N/A

## Course Textbook and Materials

### Required

- Textbook: *Excursions in Modern Mathematics 8th Edition*, by Peter Tannenbaum (ISBN-10: 032182573X)
- Calculator: You will need a calculator (with at least a square root key).

## Learning Objectives

### Course Objectives

As a student in this course, students will:

- develop persistence in solving mathematical problems
- make connections among ideas and mathematical representations
- develop reasoning and sense making
- communicate their thinking
- apply mathematics to the real world situations

### Module Objectives

#### **Module I: Introductions & The Mathematics of Elections (Chapter 1)**

1. We will calculate election results using four different election methods. (The four methods are: the Plurality Method, the Borda Count Method, the Plurality with Elimination Method, and Pairwise Comparisons.)
2. We will assess the advantages and disadvantages among the election methods.
3. We will consider the idea of fairness while analyzing election results.

#### **Module II: The Mathematics of Power & The Mathematics of Sharing (Chapters 2 - 3)**

1. We will calculate weighted voting power using the Banzhaf method and the Shapley-Shubik method.
2. We will contrast two weighted voting methods.
3. We will be able to identify fair division methods.
4. We will create fair divisions using a variety of methods.

**Module III: The Mathematics of Getting Around (Chapter 5)**

1. We will recall the vocabulary involved with graph theory and use the concepts to solve non-routine problems.
2. We will compare and contrast Euler paths and Euler circuits.
3. We will create Euler paths and Euler circuits.

**Module IV: The Mathematics of Touring (Chapter 6)**

1. We will recall the qualities of a traveling salesman problem.
2. We will compare and contrast a Hamilton path and a Hamilton circuit.
3. We will construct optimal routes using: the Brute Force Algorithm, the Nearest Neighbor Algorithm and the Cheapest Link Algorithm.

**Module V: Population Growth Models (Chapter 9)**

1. We will define recursive and explicit formulas.
2. We will compare and contrast linear, exponential and logistic growth models.
3. We will apply the sequence formulas to identify specific terms or sums of the sequences.

**Module VI: Financial Mathematics (Chapter 10)**

1. We will apply percentage proportions to real world scenarios..
2. We will differentiate the different types of interest formulas.
3. We will calculate interest rates and balances.

**Module VII: Censuses, Surveys, Polls and Studies & Graphs, Charts and Numbers (Chapters 14 - 15)**

1. We will identify the various sampling methods (simple random sampling, convenience sampling, quota sampling, stratified sampling, census).
2. We will critique the structure and potential bias with surveys.
3. We will create various types of graphs/charts.
4. We will find and identify misrepresentations with graphs.
5. We will analyze data sets by computing and creating summaries (including the 5 number summary, box plot, standard deviation, etc.)
6. We will interpret graphs/charts.

**Module VIII: Probabilities, Odds and Expectations & The Mathematics of Normality (Chapters 16 - 17)**

1. We will distinguish between permutations and combinations.
2. We will compute probabilities.
3. We will contrast probabilities and odds.
4. We will analyze normal distribution situations.

## Course Requirements

### Online Course

This is an online course and therefore there will not be any face-to-face class sessions. All assignments and course interactions will utilize internet-based technologies.

### **Attendance Policy**

You should plan to work on this course everyday. This means that you must have a reliable and consistent internet connection throughout the duration of the course. It is strongly recommended that you not take any vacations during this course. This is a condensed, fast-paced course and it would be extremely difficult to catch up after a prolonged absence.

### **Course Preparation and Participation**

*Preparation* for class means reading the assigned readings & reviewing all information required for that week. *Attendance* in an online course means logging into the Blackboard and on a regular basis and *participating* in the all of activities that are posted in the course.

### **Studying and Preparation Time**

The course requires you to spend time preparing and completing assignments. A three-credit course requires 144 hours of student work. Therefore expect to spend approximately *18 hours a week* preparing for and actively participating in this 8-week course.

### **Computer Requirements**

This course requires that you have access to a computer that can access the internet. You will need to have access to, and be able to use, the following software packages:

- A web browser (Chrome or Mozilla Firefox)
- Adobe Acrobat Reader (free)
- Adobe Flash Player (free)
- Word processing software—Microsoft Word or Google Docs

You are responsible for having a reliable computer and internet connection throughout the course.

### **Email and Internet**

You must have an active Doane University email account and access to the Internet. *All instructor correspondence will be sent to your Doane University email account.* Please plan on checking your Doane Gmail account regularly for course related messages.

This course uses Blackboard for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Blackboard Course Site can be accessed at <http://bb2.doane.edu>

### **Campus Network or Blackboard Outage**

When access to Blackboard is not available for an extended period of time (greater than one entire evening - 6pm till 11pm) you can reasonably expect that the due date for assignments will be changed to the next day (assignment still due by midnight).

## **Late or Missed Assignments**

ALL assignments must be finished and turned in to complete the course. Unless the instructor is notified BEFORE the assignment is due and she provides an opportunity for the student to submit an assignment late, points may be taken off for a late assignment (up to 50% of the assignment's points).

## **Submitting Assignments**

All assignments, unless otherwise announced by the instructor, must be submitted via Blackboard. Each assignment will have a designated place for submission.

## **Drop and Add dates**

If you feel it is necessary to withdraw from the course, please contact your advisor for full details on the types of withdrawals that are available and their procedures.

## **Subject to change notice**

All material, assignments, and deadlines are subject to change with prior notice. It is your responsibility to stay in touch with your instructor, review the course site regularly, or communicate with other students, to adjust as needed if assignments or due dates change.

## **Academic Integrity**

Doane University expects and requires all its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. Academic dishonesty, the act of knowingly and willingly attempting or assisting others to gain academic success by dishonest means, is manifested in various measures. Gehring, et al, (1986) suggests that four categories of academic dishonesty exist<sup>1</sup>:

- a. Cheating
- b. Fabrication
- c. Facilitating academic dishonesty
- d. Plagiarism

For more information on academic integrity, please visit the website:

<http://catalog.doane.edu/content.php?catoid=4&navoid=191>

## **Course Grading**

### **Grades and Grading Scale**

Assignment of letter grades is based on a percentage of points earned. The letter grade will correspond with the following percentages achieved. All course requirements must be completed before a grade is assigned.

A	100 – 90
B	89 – 80
C	79 – 70
D	69 – 60

**See the requirements for the specific Assignments on Blackboard.**

## **How to Succeed in this Course**

- Check your Doane email regularly
- Log in to the course web site daily
- Communicate with your instructor
- Create a study schedule so that you don't fall behind on assignments

## **Technical Support Contact Information**

For technical assistance 24 hours a day, 7 days a week, please contact the Doane University Technology Office Help Desk:

Phone: 402-826-8411

Email: [helpdesk@doane.edu](mailto:helpdesk@doane.edu)

Web: <http://www.doane.edu/about-doane/offices/its/help-and-support>

## **Accessibility Statement**

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with ☐

Disabilities Act of 1990, professional disability specialists and support staff at Doane University facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities. Doane University staff coordinate student transitions from high schools and community colleges, conduct in-service training for faculty and staff, enable the resolution of accessibility issues, conduct community outreach, and facilitate collaboration among Doane University staff on disability policies, procedures, and accommodations.

## **Accessibility Services**

Doane University Access/Services for Students with Disabilities

<http://www.doane.edu/disability-services>

Contact Person: Chris Brady Phone: 402.467.9031 Email: [chris.brady@doane.edu](mailto:chris.brady@doane.edu)

Self-Identification Form: <https://www.doane.edu/student-disability-identification-form>

## **Academic Support**

Contact Person: Tere Francis Phone: 402.466.4774 Email: [terese.francis@doane.edu](mailto:terese.francis@doane.edu)

## **Student Services**

<http://www.doane.edu/gps/student-services>

## **Student Conduct Statement**

Students are required to adhere to the behavior standards listed in **Doane University Policy Manual**

Appropriate classroom behavior is defined by the instructor. This includes the number and length of individual messages online. Course discussion messages should remain focused on the assigned discussion topics. Students must maintain a cordial atmosphere and use tact in expressing differences of opinion. Inappropriate discussion board messages may be deleted if an instructor feels it is necessary. Students will be notified privately that their posting was inappropriate.

Student access to the course Send Email feature may be limited or removed if an instructor feels that students are sending inappropriate electronic messages to other students in the course.

## **Instructional Technology Accessibility and Privacy Policies**

<http://www.doane.edu/instructional-design-services/policies>

## **Syllabus Disclaimer**

The instructor views the course syllabus as an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes face-to-face, via email or in the course site Announcements. Please remember to check your Doane University email and the course site Announcements often.