# MATH 113 Departmental Syllabus

**MATH 113 Course Description:** Collection of topics that explore the application of mathematics in a variety of complex natural and business environments. Required topics include surveys, data collection and analysis, and basic probability. Four (or more) additional topics would be chosen from the following list: management science (Euler and Hamilton circuits, networks, digraphs, scheduling, etc.), social choice, finance, growth or decay, coding information, shape and form in nature and art, similar figures, logic, set theory, numeration systems, and measurement.

**PREREQUISITE:** Students can enroll in this math course with any math placement level. See https://www.mathsci.udel.edu/courses-placement/ud-math-placement for more information.

**RESTRICTIONS:** Students who received credit in MATH114, MATH115, MATH117, MATH221, MATH222, MATH231, MATH241, MATH242, or MATH243 are not eligible to take this course without permission.

**TEXTBOOK:** Excursions in Mathematics, by P. Tannenbaum, Pearson Publishing, 9th edition.

**OTHER REQUIRED MATERIALS:** Pearson MyMathLab. Calculator: a graphing calculator was required in AY 2019-20, whereas a scientific or graphing calculator was required for AY 2020-21.

## TEXTBOOK SECTIONS AND/OR TOPICS *(for Spring 2021)*

| Title (Textbook sections) | Number of 50-minute classes |
|---|---|
| Chapter 5: The Mathematics of Getting Around<br>• 5.1: Street-Routing Problems<br>• 5.2: An Introduction to Graphs<br>• 5.3: Euler's Theorems and Fleury's Algorithm<br>• 5.4: Eulerizing and Semi-Eulerizing Graphs | 3 |
| Chapter 6: The Mathematics of Touring<br>• 6.1: What is a Traveling Salesman Problem?<br>• 6.2: Hamilton Paths and Circuits<br>• 6.3: The Brute-Force Algorithm<br>• 6.4: The Nearest-Neighbor and Repetitive Nearest-Neighbor Algorithms | 3 |

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| • 6.5: The Cheapest-Link Algorithm | |
| Chapter 7: The Mathematics of Networks<br>• 7.1: Networks and Trees<br>• 7.2: Spanning Trees, MSTs, and MaxSTs<br>• 7.3: Kruskal's Algorithm | 3 |
| Chapter 9: Population Growth Models<br>• 9.1: Sequences and Population Sequences<br>• 9.2: The Linear Growth Model<br>• 9.3: The Exponential Growth Model<br>• 9.4: The Logistic Growth Model | 4 |
| Chapter 10: Financial Mathematics<br>• 10.1: Percentages<br>• 10.2: Simple Interest<br>• 10.3: Compound Interest | 3 |
| Chapter 11: The Mathematics of Symmetry<br>• 11.2: Reflections<br>• 11.3: Rotations<br>• 11.4: Translations<br>• 11.5: Glide Reflections | 4 |
| Chapter 14: Censuses, Surveys, Polls, and Studies<br>• 14.1: Enumeration<br>• 14.2: Measurement<br>• 14.3: Cause and Effect | 3 |
| Chapter 15: Graphs, Charts and Numbers<br>• 15.1: Graphs and Charts<br>• 15.2: Means, Medians, and Percentiles<br>• 15.3: Ranges and Standard Deviations | 4 |
| Chapter 16: Probabilities, Odds, and Expectations<br>• 16.1: Sample Spaces and Events<br>• 16.2: The Multiplication Rule, Permutations, and Combinations<br>• 16.3: Probabilities and Odds | 4 |
| **Total** | **31** |

**GRADING SCALE:** A ≥ 90%, A- ≥ 87%, B+ ≥ 84%, B ≥ 80%, B- ≥ 77%, C+ ≥ 74%, C ≥ 70%, C- ≥ 67%, D+ ≥ 64%, D ≥ 60%, D- ≥ 57%, F < 57%.

**ASSESSMENT COURSE GRADE WEIGHT:** MyMathLab homework ~10%, quizzes and other assignments 15-20%, three mid-semester exams 45-55%, final exam 22-25%

**Notes:** Prepared by Anthony Mak and Gangotryi (Ganges) Sorcar, July 2021. Referenced the Fall 19 syllabus, the Spring 2020 syllabus, the Fall 2020 syllabus and the Spring 2021 syllabus from the Newark Campus. Approved by the Foundational Math Committee.