

# UAF DMS Guidelines for MATH 114X –Patterns and Society

Across all sections of Math 114X offered by UAF campuses (delivered in person or online), all syllabi must minimally satisfy the following requirements.

Note: This course meets 1 hour per day 3 days a week (or should be set up for equivalent “class” time).

1. General guidelines set by UAF; follow this link to the [UAF syllabus requirements](#)
2. GER Information (sample statement below):

This course is listed as a General Education Math Course as such this course is expected to meet the general learning outcomes 1 and 2.

1. Build knowledge of human institutions, sociocultural processes, and the physical and natural works through the study of mathematics. Competence will be demonstrated for the foundational information in each subject area, its context and significance, and the methods used in advancing each.
2. Develop intellectual and practical skills across the curriculum, including inquiry and analysis, critical and creative thinking, problem solving, written and oral communication, information literacy, technological competence, and collaborative learning. Proficiency will be demonstrated across the curriculum through critical analysis of proffered information, well-reasoned solutions to problems or inferences drawn from evidence, effective written and oral communication, and satisfactory outcomes of group projects.

3. Text: Excursions in Mathematics by Tannenbaum, 9<sup>th</sup> Edition

- Chapter 3: 3.1-3.6 (r)
- Chapter 4: 4.1-4.4 (r)
- Chapter 5: 5.1-5.4 (r)
- Chapter 6: 6.1-6.5 (r)
- Chapter 7: 7.1-7.3 (r)
- Chapter 8: 8.1-8.5 (r)
- Chapter 11: 11.1-11.7 (r)
- Chapter 12: 12.1-12.4 (r)
- Chapter 13: 13.1-13.4 (r)

4. Timing of material

For each of the following, the minimum time spent on the sections is listed.

This is a suggested outline with Mastery Assessments (score of 80% minimum) and comprehensive Final Exam.

Section Topic Approx. timing

3.1 Fair Division Games	1 day
3.2 The Divider-Chooser Method	1 day
3.3 The Lone-Divider Method	1 day
3.4 The Lone-Chooser Method	1 day
3.5 The Method of Sealed Bids	1 day
3.6 The Method of Markers	1 day
4.1 Apportionment Problems and Apportionment Methods	1 day
4.2 Hamilton's Method	1 day
4.3 Jefferson's Method	1 day
4.4 Adam's and Webster's Methods	1 day
4.5 The Huntington-Hill Method	1 day
4.6 The Quota Rule and Apportionment Paradoxes	1 day

## Math 114X Syllabus Guidelines

### Exam over Chapters 3 and 4

5.1 Street-Routing Problems	1 day
5.2 An Introduction to Graphs	1 day
5.3 Euler's Theorems and Fleury's Algorithm	1 day
5.4 Eulerizing and Semi-Eulerizing Graph	1 day
6.1 What is a Traveling Salesman Problem?	1 day
6.2 Hamilton Paths and Circuits	1 day
6.3 The Brute-Force Algorithm	1 day
6.4 The Nearest-Neighbor and Repetitive Nearest-Neighbor Algorithms	1 day
6.5 The Cheapest-Link Algorithm	1 day

### Exam over Chapters 5 and 6

7.1 Networks and Trees	1 day
7.2 Spanning Trees, MSTs and MaxSTs	



## Math 114X Syllabus Guidelines

- Count Hamilton paths and circuits on a complete graph
  - Use Brute-Force, Nearest-Neighbor, Repetitive Nearest-Neighbor, and Cheapest-Link Algorithms
- Trees
- Modeling with graphs/networks
  - Identify and draw trees and spanning trees
  - Count spanning trees in a graph