

Syllabus

Math 301 Practical Mathematics

Contact Information:

Course Description:

The course covers contemporary topics and shows the power of mathematics by presenting applied math concepts in fields such as manufacturing and distribution, finance, technology and sustainable growth. This course, designed for non-math majors, does not require a prohibitive amount of prerequisite mathematical knowledge (i.e. Calculus or other upper level mathematics). It's focus is on the practical side of mathematics used in the real world. Topics to be covered include: Graph Theory, Management Science, Identification Numbers, Transmitting Information and Cryptography, and Geometric Growth.

Prerequisites:

Basic high school math

Learning Outcomes:

Upon successful completion of this course, students will:

- Define key graph theory terms.
- Model highway systems and communications infrastructures as graphs.
- Apply graph theory algorithms to design optimal routes.
- Solve network and scheduling problems with heuristics.
- Diagram scheduling problems as Gantt charts.
- Construct schedules that make the best use of resources.
- Understand and apply the rules for identification numbers, such as bar code, zip codes, bank numbers, ISBN, etc.
- Use cryptography to encode and decode information.
- Use check digit schemes to find errors in transmitted information.
- Apply geometric growth models to finance and biological populations.
- Determine implications of geometric growth in finance and biological populations.

Evaluation/Grading:

Description	Points
Online Quizzes	4 @ 50 points each, total 200 points
Homework Assignments/Case Studies	8 @ 10 points each, total 80 points
Short Writing Assignments	4 @ 30 points each, total 120 points
Participation (discussion forum)	8 @ 5 points each, total 40 points
Final Project (Poster, Video Presentation)	1 @ 100 points
TOTAL	540 total points

Grading Scale: A 90-100% B 80-89% C 70-79% D 60-69% F Below 60%

Course Outline:

Week	Topics Covered	Assessments
1	Graph Theory Vocabulary Euler Circuits Hamiltonian Circuits	Homework Case Studies
2	Traveling Salesman Problem Shortest Path Minimum-Cost Spanning Trees	Writing Assignment Quiz
3	Critical Path Analysis Scheduling Tasks	Homework Case Studies
4	Critical Path Schedules Gantt Charts	Writing Assignment Quiz
5	Identification Numbers Binary Codes	Homework Case Studies
6	Cryptography Encoding with Parity-Check Sums	Writing Assignment Quiz
7	Geometric Growth and Financial Models Geometric Growth and Financial Models	Homework Case Studies
8	Nonrenewable and Renewable Resources Finalize Projects	Writing Assignment Quiz Final Project Due

Homework/Case Studies:

Homework and Case Study assignments must be submitted by the due date using the Assignments tool course website. I suggest using a word processor (e.g. Microsoft Word or OpenOffice) for your assignments. You can also scan and upload handwritten assignments. All homework problems must show work for credit. Homework assignments with answers only will be given a zero.

Quizzes:

Quizzes will be given through course website and may be taken during the week in the schedule above. Quizzes will be posted for 7 days. You must take the quiz during the given time slot or no credit will be given.

Writing Assignments:

There will be four short writing assignments for this course. The assignments will be no more approximately two pages in length (double space, 1in margin). The assignments must be submitted by the due date and must be submitted online within the course website. Grading rubrics will be supplied at the beginning of the class.

Project:

You will choose a topic related to the mathematics covered in the course that interests you and do additional research on the topic to find an application that was not covered in the course. The

project for the course will be comprised of a poster and a short video (3 – 5 minutes) of you explaining a topic real-world application of the mathematics covered in this course. You will share both the poster and the video with the others in the class via the course website. You will also view others projects and be asked to comment on them. The project may be done at any point throughout the course, but will be due by the last week of classes. Grading rubric will be supplied at the beginning of the class.