Syllabus

MAT 101 - Mathematics for Liberal Arts

General Information

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Department Mathematics

Course Prefix MAT

Course Number 101

Course Title Mathematics for Liberal Arts

Course Information

Catalog Description This course is intended for the liberal arts student. The purpose of this course is to share the excitement and enjoyment of contemporary mathematical thinking. The course answers the question, "What do mathematicians do, practice, or believe in?" The use of mathematics in areas of business and industry, politics, networking and telecommunication will be studied with the intent to develop reasoning ability, logical thinking, critical reading, and written and oral communication. The topics are selected so that they are self-contained.

Credit Hours 3

Lecture Contact Hours 3

Lab Contact Hours 0

Other Contact Hours 0

Grading Scheme Letter

Prerequisites

None

Co-requisites

None

First Year Experience/Capstone Designation

This course DOES NOT satisfy the outcomes applicable for status as a FYE or Capstone.

SUNY General Education

This course is designated as satisfying a requirement in the following SUNY Gen Ed category
Mathematics (and Quantitative Reasoning)

FLCC Values

Institutional Learning Outcomes Addressed by the Course
Inquiry and Interconnectedness

Course Learning Outcomes

Course Learning Outcomes

1. Understand and execute algorithms to navigate through and solve problems.
2. Via the topics studied throughout the course, make connections between the historical context and applications to current society.
3. Describe and use the process of abstraction to model real world problems.
4. Evaluate obtained results for reasonableness.

Outline of Topics Covered

The instructor should cover five of the six general topic areas.

1) Modeling with Graph Theory
a) Vertices and Edges
b) Degree of a Vertex
c) Open and Closed Trails
d) Length, Distance and Eccentricity
e) Euler Trails and Euler’s Theorem
f) Hamilton Trails
g) Graph Models

2) Weighted Graphs
a) Optimal and Efficient Algorithms
b) Weighted Graphs
c) Minimum Spanning Trees
d) Traveling Salesman Problems
i) Minimum Edge Algorithm

ii) Nearest Neighbor Algorithm
iii) Brute Force Algorithm
e) Route Inspection Problems

3) Voting Theory
a) Preference Ballots and Preference Schedules
b) Fairness Criteria
c) The Plurality Method
d) Copeland’s Method
e) Instant Runoff Voting
f) The Borda Count Method

4) Weighted Voting
a) Quota
b) Winning Coalitions and Critical Players
c) Dummies, Dictators and Veto Power.
d) Creating a Weighted Voting System
e) Banzhaf Power
f) Shapely-Shubik Power

5) Project Management
a) Precedence Relations
b) PERT Charts
c) Time and Optimality
d) Schedules
e) Priority Lists
f) The Critical Path Method
g) Anomalies in Scheduling

6) Game Theory
a) Creating a Game Matrix
b) Alternate Move, Single Choice Games
c) Nash Equilibria
d) Pareto Inferior Outcomes
e) Prisoner’s Dilemma, Chicken and Battle of the Sexes