Math 105 Course Outline:

1. Statistics (required)
   a. Collecting Data
      i. Sampling frame
      ii. Polling
      iii. Bias and Errors
      iv. Clinical studies
      v. Capture and recapture method
   b. Displaying data
      i. Bar graphs, pie chart, and histogram
      ii. Relative frequency
      iii. Assignment in excel making graphs
      iv. Variables
         1. qualitative and quantitative
         2. Continuous and discrete
   c. Data characteristics
      i. Mean (Average)
      ii. Median
      iii. Mode
      iv. Standard deviation
      v. Percentile and quartiles

2. Finance (required)
   a. Percentages
      i. Markup
      ii. Markdown
   b. Interest
      i. Simple
      ii. Compound
      iii. Continuous
   c. Savings formula (periodic deposits)
   d. Credit Card
   e. Amortization formula
   f. Affordability of buying a house

3. Voting Methods (topics selected from the following)
   a. Preference schedule
      i. Plurality, Plurality with elimination, Majority
      ii. Borda Count
      iii. Pair-wise competition, Condorcet competition
      iv. 4 Fairness Criterion, Arrow's Impossibility Theorem
   b. Weighted Voting System
      i. Power: dictator, veto, dummy
      ii. Banzhaf Power Index
      iii. Shapley-Shubik Power Index
   c. Apportionment
      i. Hamilton Method
      ii. Jefferson's and Adam's method
      iii. Webster's Method
      iv. Huntington-Hill's Method
      v. Quota Rule and Paradoxes (Alabama, Population and New State)

4. Graph Theory (topics selected from the following)
   a. General graph theory
      i. Graph Models, Concepts, Usage
      ii. Euler's Theorems
      iii. Euler Graphs, Fluery's Algorithm
      iv. Eulerization
   b. Hamilton circuits and Hamilton paths
      i. Brute Force
      ii. Nearest neighbor algorithm (including repetitive nearest neighbor)
      iii. Cheapest-link algorithm
   c. Networks
      i. Trees
      ii. Kruskal's algorithm
      iii. Prim's algorithm
   d. Scheduling
      i. Basic Elements of Scheduling
      ii. Directional Graphs
      iii. Critical Time and Critical path

5. Probability (optional)
   a. Principles of counting
      i. Multiplication principle
      ii. Repetition
      iii. Permutations
      iv. Combinations
   b. Probability distributions
   c. Joint probabilities
      i. Dependent events
      ii. Independent events
   d. Expected value
   e. Risk analysis

6. Geometric Symmetry (optional)