Selection of Topics for Math 105

General graph theory
 Circuits and Paths
 Graph Models, Concepts, Usage
 Euler's Theorems
 Euler Graphs, Fluery's Algorithm
 Hamilton circuits and Hamilton paths
 Brute Force
 Nearest neighbor algorithm (including repetitive nearest neighbor)
 Cheapest-link algorithm
 Networks
 Trees
 Kruskal's algorithm and Prim's algorithm
 Scheduling
 Basic Elements of Scheduling
 Dependent and Independent events
 Directional Graphs
 Critical Time and Critical path

Statistics
 Sampling Methods, how is data collected
 Bias
 Polling and clinical studies
 Estimating Population (Capture-Recapture)
 How statistical data is collected and how it can be used to mislead the public
 Descriptive Statistics
 Use statistics to analyze data.
 Compute the mean, median, mode percentile, and standard deviation for a data set.
 Compute percentiles which includes 1st and 3rd quartiles
 Box and whiskers
 Frequency, relative frequency tables
 Bar graphs, pie charts, histogram charts

Finance
 Percentages, markups and markdowns
 Solve interest problems using interest formulas for simple, compound and continuous interest.
 Effective Annual rates: APR versus APY
 Credit Cards and rent to own
 Analyze and solve problems using savings and amortization formulas.
 Annuities, savings plans where periodic payments are made.
 Affordability of buying a house

Voting Methods
 Preference schedule
 Plurality, Plurality with elimination, Majority
 Borda Count
 Pair-wise competition, Condorcet competition
 4 Fairness Criterions,
 Arrow's Impossibility Theorem
 How the site of the Olympic Games is chosen, academy awards are chosen
 Weighted Voting System
 Power: dictator, veto, dummy
 Banzhaf Power Index
 Shapley-Shubik Power Index
 Apportionment
 Hamilton Method
 Jefferson's and Adam's method
 Webster's Method
 Huntington-Hill's Method
 Quota Rule and Paradoxes (Alabama, Population and New State)