MTH 1301

Text: *Excursions in Modern Mathematics*, 2nd Custom edition for Baylor University - Pearson, 2014 - by Peter Tannenbaum

Tentative Course Outline:

**SOCIAL CHOICE**
The Basic Elements of an Election
The Plurality Method
The Borda Count Method
The Plurality-with-Elimination Method
The Method of Pairwise Comparisons
Fairness Criteria and Arrow's Impossibility Theorem
An Introduction to Weighted Voting
Banzhaf Power
Shapley-Shubik Power
Subsets and Permutations
Fair-Division Games
The Divider-Chooser Method
The Lone-Divider Method
The Lone-Chooser Method
The Method of Sealed Bids
The Method of Markers
Apportionment Problems and Apportionment Methods
Hamilton's Method
Jefferson's Method
Adams's and Webster's Methods
The Huntington-Hill Method
The Quota Rule and Apportionment Paradoxes
The Mathematics of Elections: The Paradoxes of Democracy
The Mathematics of Power: Weighted Voting
The Mathematics of Sharing: Fair-Division Games
The Mathematics of Apportionment: Making the Rounds
MANAGEMENT SCIENCE
An Introduction to Scheduling
Directed Graphs
Priority-List Scheduling
The Decreasing-Time Algorithm
Critical Paths and the Critical-Path Algorithm
The Mathematics of Scheduling: Chasing the Critical Path

GROWTH
Sequences and Population Sequences
The Linear Growth Model
The Exponential Growth Model
The Logistic Growth Model
Percentages
Simple Interest
Compound Interest
Consumer Debt
Population Growth Models: There Is Strength in Numbers
Financial Mathematics: Money Matters

SHAPE AND FORM
Fibonacci Numbers
The Golden Ratio
Gnomons
Spiral Growth in Nature
Fibonacci Numbers and the Golden Ratio: Tales of Rabbits and Gnomons

STATISTICS
Enumeration
Measurement
Cause and Effect
Graphs and Charts
Means, Medians, and Percentiles
Ranges and Standard Deviations
Sample Spaces and Events
The Multiplication Rule, Permutations, and Combinations
Probabilities and Odds
Expectations
Measuring Risk
Approximately Normal Data Sets
Normal Curves and Normal Distributions
Modeling Approximately Normal Distributions
Normality in Random Events
Censuses, Surveys, Polls, and Studies: The Joys of Collecting Data
Graphs, Charts, and Numbers: The Data Show and Tell
Probabilities, Odds, and Expectations: Measuring Uncertainty and Risk
The Mathematics of Normality: The Call of the Bell