

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