

Syllabus and Text for Math 110

SUMMER 2022

Textbook: Introduction to Mathematical Literacy, 2nd Edition
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This course satisfies the Mathematical and Quantitative Reasoning (MQR) requirement of the Pathways General Education Required Core. Below is the Learning Outcomes that all MQR courses satisfy:

MQR 1: Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
MQR 2: Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
MQR 3: Represent quantitative problems expressed in natural language in a suitable mathematical format.
MQR 4: Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
MQR 5: Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
MQR 6: Apply mathematical methods to problems in other fields of study.

The syllabus and text for Math 110 have been changed – essentially, the 2 chapters on *weighted voting systems* and *exponential growth* have been deleted and replaced by a Chapter on *voting methods* and a Chapter on *apportionment*. This makes our course more in line with other math literacy courses throughout CUNY and throughout the country. The 4 chapters on *Probability* and *Statistics* cover the same basic material as our previous text did – the difference being that it all comes from the *same* text and the new text has some interesting examples showing how to perform statistical routines through Excel (optional). For the Chapter on *Voting Methods* please cover the 5 different voting methods (plurality, plurality with runoffs, Borda’s method, head to head comparisons, and approval voting). You should try and do in class at least one example where each of these methods produces a different winner. Additionally, you should show that each of the above methods is *unfair* according to Arrow’s criteria, and then talk about Arrow’s *Impossibility Theorem*.

For the Chapter on *Apportionment*, please cover *Hamilton’s Method*, *Lowndes’ Method*, *Jefferson’s Method*, *Webster’s Method* and the *Hill-Huntington Method*. Additionally, please cover the material on quota violations and individual paradoxes, such as the *Alabama Paradox*. Finally, please cover the material in Section 2.4 – the Balinski and Young theorem together with illustrations of how the above mentioned apportionment methods either are susceptible to *paradoxes* or otherwise are susceptible to *quota violations*.