

LIBERAL ARTS MATHEMATICS FOR HUMAN FLOURISHING

**23RD BIENNIAL CONFERENCE OF THE ACMS
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AGENDA

Journey in liberal arts math

OER Development

Acknowledgements and thanks

BACKGROUND

- “Liberal arts math”: a survey of interesting mathematical topics
- Favorite course to teach in grad school
- Developed a version launched during my third year at Dordt (Fall '16)
 - **One question:** are there any cheaper alternatives?
- **Another question:** how can I bring a distinctly Christian perspective of mathematics into this course?
- Francis Su’s January 2017 address (and subsequent book), *Mathematics for Human Flourishing* offers an orientation

“[T]he proper practice of mathematics cultivates virtues that help people flourish.”

Francis Su, *Mathematics for Human Flourishing* (p. 10)

TOWARD A FLOURISHING-ORIENTED COURSE

- Units of the 2019 course: **Play**, **Truth**, **Justice**, and **Beauty** (final project)
- Resources for Spring 2019 edition of the course:
 - *Discovering the Art of Mathematics*, by Fleron, Hotchkiss, Ecke, and von Renesse
 - ▶ *Games and Puzzles* (focus on Rubik's cube)
 - ▶ *Truth, Reasoning, Certainty, and Proof*
 - *The Mathematics of Voting and Elections*, 2nd ed. by Hodge and Klima

PRETeXT NOTES \Rightarrow OER

- Started writing notes in PreTeXt in Spring 2020
- New topic: SIR epidemiological modeling with discrete dynamical systems
- Additional development in Spring 2021
- Iowa Private Academic Libraries (IPAL) OER development grant opportunity for 2021/2022 AY for course buyout and student assistance

TEXT: EXPLORATIONS IN MODERN MATHEMATICS

- Four main themes: **Play**, **Truth**, **Power**, and **Justice**
- Topics: Rubik's cube, deductive reasoning and logic, discrete dynamical systems, graph theory, modular arithmetic and coding theory, and voting theory
- Focus on active learning
- (Almost) all sections conclude with a few exercises and additional explorations
- Pairs well with the M4HF book!

VERSIONS OF THE TEXT

- Text website/HTML version: emmath.org
- PDF version available for download
- PreTeXt source code on GitHub



FUTURE ASPIRATIONS

- More exercises
- More topics
 - Additional games (e.g., chess, nim, Sudoku)
 - Additional topics in math and democracy
 - Cryptography
 - Beauty
- Collaborators (??)

ACKNOWLEDGMENTS

- Previous influential texts: particularly *DaoM*, Burger & Starbird's *The Heart of Mathematics*, and Hodge & Klima
- Francis Su's winsome framework for thinking about mathematics
- IPAL OER grant/Iowa Governors Emergency Education Relief fund
- Student assistants: Anika Homan and Libby Riege

Thanks for coming!

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