MATH 251, Discrete Matheamtics
Syllabus, Fall 2021

Material. The textbook for the course is **Discrete Mathematics and its Applications**, 7th Ed., by Kenneth H. Rosen. We will cover material from Chapters 1-5 and 8, specifically

Chapter 1: Sections 1-5 (propositional logic; predicates; quantifiers)

Chapter 2: Sections 1-4 (sets; functions; sequences and summation)

Chapter 3: Sections 1-3 (algorithms, their growth and complexity)

Chapter 4: Sections 1, 3-6 (modular arithmetic; Euclidean algorithm; solving congruences; RSA encryption)

Chapter 5: Sections 1-3 (mathematical induction; strong and structural induction; recursive definitions)

Chapter 8: Sections 1-3 (recurrence relations; solving linear relations; divide-and-conquer algorithms)

Learning Outcomes. The student who successfully completes this course, will be able to

- translate between English sentences and symbolic logical expressions, build and compare truth tables for compound expressions, and negate nested quantifiers.
- find witnesses in order to demonstrate big-O, big-Omega and big-Theta time complexity.
- apply induction to prove mathematical statements.
- perform modular arithmetic, solve systems of linear congruences, and find multiplicative inverses.
- model counting problems using recurrence relations, and solve linear recurrence relations with constant coefficients.

Class Policies.

- **Come to class**, arriving and seatec on time, each day. If, for health reasons, you do not attend, contact a friend or the professor about material missed.
- **Turn off and put away cell phones**. Electronic devices, generally, should be stowed, unless specifically directed to use as a learning tool.
- **Read assigned passages**, usually taken from the textbook. It is preferable to do so before the session in which the material will be discussed. It is best to read with paper and pencil on-hand, testing out ideas as you go.
- **Participate full in class activities**.
- **Spend some of your discretionary time between class meetings on course material**. Do this without exception.

- **Review feedback on things you hand in**.
- **Keep a log of your scores** on homeworks and exams. This is handier than going into WebWork and Gradescope to learn what those scores are, though that is always available. If, at any time, you want to estimate your grade, calculate an approximate GPA for each grade category, and then use this app to calculate a weighted average.
- **Take ownership for discerning the relative importance of various concepts**. This is part of the discipline of becoming a good learner. Your professor will indicate concepts covered on an tests, but not how to apportion study time between those concepts.
- **Check for calendar updates, and your Calvin email regularly**. It is best to do this at least once in the evening each day.

Occasionally there are special circumstances that require class policies be adjusted for a particular student. In such cases, it is the responsibility of the student to inform me of the situation **as soon as possible**, so that appropriate arrangements can be made. This includes, but is not limited to, students with documented disabilities.

Accommodations. Calvin University has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Students with disabilities who may need some accommodation in order to participate fully in this class are urged to contact Disability Services in the Center for Student Success (`disabilityservices@calvin.edu`) as soon as possible to explore what arrangements need to be made to assure access. The three of us (student, instructor, and Disability Services) will work together to find an appropriate solution.

Grading. The various weights will be as follows:

- online homework and quizzes: 8%
- written homework: 12%
- Tests: 51%
- Final Exam: 29%

If, at any point in the course, you wish to estimate your grade, use this app to calculate your approximate grade as a weighted average according to the weights given above, leaving out those components that have not yet occurred.

Exams must be taken at the specified dates and times. Exceptions are negotiated in advance with the professor, and are limited to emergencies. Conveniently flights and other pre-arranged travel plans do not apply.

Cheating, which I define as any instance of using unauthorized sources, notes or devices (particularly relevant during tests); copying from another student or knowingly

allowing a student to copy from your work, is unacceptable, and will, in the first instance, result in a zero. A second offense will result in dismissal from the course with a course grade of "F". Read more in Calvin's Student Conduct Code.

Exceptions. I reserve the right to make changes or exceptions to course policies, including those described in this document, either for the entire class or for individuals. The ultimate goal in this course is **learning**, and formal requirements should not unnecessarily stand in the way of that. Thus, if you think that any of the conditions of the course are interfering with learning, please speak with me about this, and we will consider what can be done.