Course Title: Discrete Mathematics for CS, MATH 217 - 02 Fall 2020

Credits: 4

Prerequisite: MATH 119 with a C- or higher grade, or MATH 115 and MATH 116 both with a C- or higher grade.

Course Description: This course is designed to serve Computer Science majors. Its goal is to introduce the student to fundamental topics of Discrete Mathematics such as propositional logic and Boolean algebras, set theory, functions, relations, modular arithmetic, mathematical induction and recursion, graphs and trees, combinatorics and discrete probability. These topics are studied in depth in subsequent Computer Science courses.

Instructor: Nelson Castaneda
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I will not see students in my office this semester. All office hours will be conducted online.

Office Hours: Online using Blackboard Collaborate. You will find a link to this application on the Blackboard Learn menu for our course. I will be available to meet with you on the following times:
Monday and Wednesday 3:00 - 4:30 PM,
Friday 11:00 AM – 12:00 PM.

We can arrange to meet at a different time if necessary.


Lecture notes and sets of practice problems will be posted on Blackboard Learn.

Class Meeting Times: MWF 1:40 – 2:50 PM Online.

Course Requirements: Attend and participate in class regularly; complete homework assignments; take tests, as scheduled. A general rule for any college course is that you are expected to put in at least 2 hours of work outside of class for every hour in class.

Coverage: We cover most sections from Chapters 1, 2, 9, 12, 5, and 6, some sections from Chapters 3, 4, and 7, and the introduction to graphs and trees based on sections 10.2, 11.1, and 11.2.

Graphing Calculators: Calculators are not essential for this course. If you wish to use a calculator for tests and/or quizzes it must be no more sophisticated than the TI - 84.

Practice Problems: A list of suggested problems from the book is provided at the end of this syllabus. In addition to this a file with practice problems will be posted on Blackboard Learn. You must start working on a set of problems the same day that the corresponding section is covered in class. Bring questions to class or to office hours regarding the problems that you couldn’t solve after honest attempts.

Homework: A few times during the semester selected problems will be collected for grade. Some of the assignments must be completed using \LaTeX. There will be also a few assignments that you must complete using the program Mathematica.

\LaTeX: \LaTeX is an typesetting program that is widely used to produce scientific or specialized books and manuscripts. Here is an introductory video by Dr. Rachel Schwell that shows how to use a friendly website called overleaf. Here is a Wikipedia article on Overleaf.

Wolfram Mathematica: Wolfram Mathematica is a sophisticated technical computing system that is used in several scientific disciplines. Our university has a license that allows you as a student to download a version of Mathematica for free. To download Mathematica you can go the link that is posted on the Math Resources menu of our department website.

Attendance: I expect you to join the online sessions of our course and that you participate actively.
in them through the chat, asking questions or sharing your ideas. Please keep me informed if you have to miss classes for justifiable reasons.

**Assessment:** There will be a few homework assignments to be submitted using \LaTeX and a few homework assignments to be submitted as Mathematica Notebooks. In addition to that there will be two intermediate tests, and a final exam. Class participation is worth 10%, the Latex assignments are worth 15% altogether, the Mathematica assignments are worth 15% altogether, the intermediate tests and the final exam are worth 20% each.

The minimum averages to determine the letter grades are as follows:
- A 93% A- 90% B+ 87% B 83% B- 80% C+ 77% C 73% C- 70% D+ 67% D 63% D- 60%

**Final Exam:** Wednesday, December 9th from 1 to 3 PM.

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**University Policies:**

1. You must take the final examination at the time specified in the university’s Final Exam Schedule: Wednesday, December 9th, 1:00 - 3:00 PM.

2. If you need course adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible. My telephone number and office hours are given above.

I will need a copy of the accommodation letter from Student Disability Services in order to arrange your class accommodations. Contact Student Disability Services, Willard - DiLoreto Hall, Room W 201, if you are not already registered with them. Student Disability Services maintains the confidential documentation of your disability and assists you in coordinating reasonable accommodations with your faculty.

3. In the event of a weather emergency which requires curtailment or cancellation of classes, listen to WTIC (1080 AM) or call (860) 832-3333 for the “general snow message,” or check the online Cancelation/Delay Information.

4. Students may drop full semester courses up to the last day of the third week of classes in the regular semester. Courses dropped by Tuesday, September 15 will not appear on the student’s transcript. Please drop the course by September 15 if you think that this course is not appropriate for you. Feel free to schedule an appointment with me to discuss your situation.

5. Students withdrawing from a full semester course from September 16 through November 17 (through the 12th week of the semester) may do so by completing a withdrawal form. A notation of “W” will appear on the student transcript. Withdrawals during this time do not require written authorization; however, it would be prudent for the student to discuss this matter with their instructor or/and their academic advisor.

6. Forms to either drop or withdraw from a course may be found on the registrar’s website or obtained in the registrar’s office in Willard - DiLoreto Hall, Room D 202.

7. Cessation of attendance, notice to the instructor, or telephone calls to the Enrollment Center are not considered official notice of a student’s intention to drop the course. After November 17th withdrawals are allowed only under extenuating circumstances, only for students who are passing the course, and require written approval of the course instructor and the department chair.

8. Central Connecticut State University (CCSU) will not tolerate sexual misconduct against students, staff, faculty, or visitors in any form, including but not limited to: sexual assault, sexual exploitation, sexual harassment or stalking, as defined in CCSU policies. For additional information, please consult the website of the Office of Diversity and Equity.

9. You are responsible for understanding and abiding by the University’s policy on academic integrity. Information on the policy may be found at Academic Integrity Policy. This policy is rigorously enforced by the Department of Mathematical Sciences.

10. All students are expected to demonstrate integrity in the completion of their course work. Academic integrity means doing one’s own work and giving proper credit to the work and ideas of others. It is the responsibility of each student to become familiar with what constitutes academic dishonesty and plagiarism and to avoid all forms of cheating and plagiarism. Students who engage in plagiarism and other forms of academic misconduct will face academic and possibly disciplinary consequences. Academic sanctions can range from a reduced grade for the assignment to a failing grade for the course. From a disciplinary standpoint, an Academic Misconduct Report may be filed and a Faculty Hearing Board may impose sanctions such as probation, suspension or expulsion.

11. For further information on academic misconduct and its consequences, please consult the Student Code of Conduct and the Academic Misconduct Policy.
Suggested Book Problems

1.1 Propositional Logic 1, 3, 5, 7, 11, 15, 19, 21, 25, 27, 29, 31, 33, 35, 37, 42, 43, 54.
1.3 Propositional Equivalences 1, 3, 5, 7, 11, 15, 25, 33, 39, 51.
1.4 Predicates and Quantifiers 1, 3, 5, 7, 9, 11, 13, 15, 19, 23, 27, 33, 41, 55.
1.5 Nested Quantifiers 1, 3, 5, 9, 15, 19.
1.6 Rules of Inference 1, 3, 9.
1.7 Introduction to Proofs 1, 2, 3, 5, 7, 9, 11, 13, 15, 17, 27.
1.8 Proof Methods and Strategy 1, 2, 3, 25, 26, 32.

2.1 Sets 1, 3, 5, 9, 13, 18, 19, 21, 22, 41, 50.
2.2 Set Operations 1, 3, 5, 13, 17, 21, 27, 31, 44, 52, 53, 55.
2.3 Functions 1, 7, 9, 13, 15, 21, 34, 35.
2.4 Sequences and Summation 1, 5, 7, 11, 12, 13, 15, 29, 31, 33.
2.5 Cardinality of Sets 1, 3, 5, 11, 17, 21, 28, 31, 32.
2.6 Matrices 1, 3, 11, 19, 27.

3.1 Algorithms 1, 2, 3, 5, 9, 13, 19.
3.2 The Growth of Functions 1, 3, 4, 5, 9, 20.

4.1 Divisibility and Modular Arithmetic 1, 3, 5, 7, 9, 11, 15, 17, 19, 21, 29, 35, 41, 43, 51, 52.
4.2 Integer Representations and Algorithms 1, 3, 5, 7, 8, 11, 25, 27.
4.3 Primes and Greatest Common Divisors 1, 3, 11, 13, 15, 17, 19, 21, 25.

5.1 Mathematical Induction 1, 3, 5, 7, 9, 10, 11, 15, 19, 21, 25, 31, 39, 51.
5.2 Strong Induction and Well Ordering 3, 5, 7, 11.
5.3 Recursive Definitions and Structural Induction 1, 5, 7, 9, 11, 12, 13, 14, 15, 28, 37.
6.2 The Pigeonhole Principle 1, 3, 7, 11, 15, 17, 21, 31.
6.3 Permutations and Combinations 1, 5, 6, 9, 10, 11, 13, 21, 22, 25, 27, 33.
6.4 Binomial Coefficients and Identities 1, 3, 6, 8, 9, 13, 17, 21, 27, 31, 37, 41.

7.1 An Introduction to Discrete Probability 1, 3, 5, 7, 11, 13, 17, 19, 23, 25, 27, 31, 35.
7.2 Probability Theory 1, 3, 5, 7, 10, 11, 18, 21, 25, 27, 30.
7.3 Bayes' Theorem 1, 3, 5, 7, 8, 11, 13, 15.

9.1 Relations and their Properties 1, 3, 5, 6, 7, 9, 11, 15, 22, 27, 31.
9.3 Representing Relations 1, 3, 5, 7, 11, 15, 23, 25, 27.
9.5 Equivalence Relations 1, 3, 7, 9, 11, 15, 21, 23, 25, 29, 41, 45, 54.

10.1 Graphs and Graph Models 1, 3, 5, 7, 11.

11.1 Introduction to Trees 1, 3, 5, 7, 9, 11, 17, 19, 20, 21, 23, 27, 31.
11.2 Applications of Trees 1, 3, 5, 7, 9, 13, 37.

12.1 Boolean Functions 1, 3, 5, 7, 9, 11, 15, 17, 23, 25.
12.2 Representing Boolean Functions 1, 2, 3, 7, 17.
12.3 Logic Gates 1, 2, 3, 5, 6, 9.