KETTERING UNIVERSITY

Winter 2019

SYLLABUS

CS211: Discrete Mathematics

**INSTRUCTOR:** Peter Stanchev, Ph.D., Professor ([pstanche@kettering.edu](mailto:pstanche@kettering.edu))

**OFFICE ROOM:** Room: 2-300E AB

**PHONE**: (810) 762 7927

**OFFICE HOURS:** MR 3.30pm- 4pm, W 1:20p.m - 3.30 pm and by appointment

**PREREQUISITE:** MATH101, Calculus I

**CURRENT CATALOG DESCRIPTION:**

Propositional and first-order logic; logical equivalence and inference. Proof techniques, mathematical induction and principle of diagonalization. Set operations, relations, functions. Introduction to graphs and trees and their applications to computer science. Lattice structures and Boolean algebras. Truth tables and minimization of Boolean expressions.

**COURSE TEXBOOK:**

Kenneth Rosen, Discrete Mathematics and its Applications, McGraw-Hill, sixth edition, ISBN: 978-0-07-288008-3

**MAJOR TOPICS COVERED IN THE COURSE:**

* Logical propositions and logical connectives.
* Tautologies, contradictions, logical equivalence and inference, and the laws of logic.
* Proof techniques: truth tables, direct proofs, indirect proofs.
* Predicates and quantification of logical expressions.
* Logical inference for predicate calculus.
* Basic set operations and the laws of Set Theory.
* General properties of functions: 1-1 and onto functions.
* Composition and inverse of functions.
* Proof technique: Induction.
* General properties of relations: reflexivity, symmetry, antisymmetry, transitivity.
* Equivalence relations and equivalence classes.
* Partial orderings, posets and lattice structures.
* Closure operations on relations.
* Boolean lattices/algebras and the laws of Boolean Algebra.
* Minterms, and normal forms.
* Minimization of Boolean expressions.
* Applications: Switching theory and combinational circuits.
* Cardinality of sets: Finite sets, countably infinite sets, unaccountably infinite sets.

**COURSE OBJECTIVES:**

By the end of this course, you should be able to demonstrate the ability to do all of the tasks listed below:

* Reason in a logically consistent and valid way.
* Rigorously prove simple propositions involving sets.
* Prove a relation is an equivalence relation.
* Given an equivalence relation, determine the underlying equivalence class.
* Determine properties of simple relations.
* Graph simple relations.
* Apply discrete mathematics principles to real-world situations.
* Describe the concept of multiple infinities as characterized by the integers and real numbers.
* Describe the ramifications of count ability results on computer science and engineering.

# CLASS POLICIES:

* Class Attendance is extremely important to understand the core concepts of the course. You are responsible for any material covered, the handouts and announcements made in the class. If you miss a lecture, it is your responsibility to obtain the information covered in the session.
* The examinations will be closed books, closed notes and closed neighbors. The questions can be of the multiple-choice kind, fill in the blanks, and solve problems. **There is no make-up examination for the midterm**; however, you may arrange to have the final exam count for the midterm if you have a university approved excuse.

# COURSE WORK:

**Grading:** Quizzes 1: 15%, Quizzes 2: 15%, Midterm: 35%, and Final Examination - 35%.

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**Common Statement on Students with Documented Disabilities**

The University will make reasonable accommodations for persons with documented disabilities.

Students need to register with the Wellness Center every term they are enrolled in classes. To be assured of having services when they are needed, students should contact the Wellness Center during the first week of each term. Note that it is the student’s responsibility to arrange accommodations with each professor. For more information on “Disability Services,” refer to the Student Life section of Undergraduate Catalog or the Student Life webpage. This information is also noted in the Student Handbook.

**Common Statement on Ethics in the University and Academic Integrity**

Kettering University values academic honesty and integrity. Cheating, collusion, misconduct, fabrication, and plagiarism are serious offenses. Each student has a responsibility to understand, accept, and comply with the University’s standards of academic conduct as set forth in our statement, “Ethics in the University,” and “Academic Integrity” as well as policies established by individual professors. For more information, refer to the Undergraduate Catalog or the Student Life webpage. This information is also noted in the Student Handbook.

**Common Statement on Medical Excuse Policy**

Only professors may excuse absences of any type. The Kettering University Wellness Center does not “excuse” absences except under certain specific circumstances, i.e., if an illness or injury that, after examination by a licensed health care practitioner [either at the Wellness Center or elsewhere], is determined to be either so severe or contagious that it possesses a threat to the patient or to the university community. Except in these circumstances, the Wellness Center does not produce written medical excuses.

Faculty are not expected to determine or diagnose a student’s medical condition. Faculty must use flexibility and good judgment in determining whether to excuse missed work, extend deadlines, or substitute an alternative assignment.

Students who cannot reach a suitable agreement with an instructor regarding missed classes and related assignments or tests as a result of a documented serious medical condition should contact the appropriate academic department head or the Dean of Students’ office.

**Academic Assistance**

In addition to your professors, academic assistance with class work and writing is available from the Academic Success Center (ASC) at (810) 762-7995 or academicsuccess@kettering.edu **.**

**CONVERSION SCALE:**

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| --- | --- | --- |
|  |  | Equivalent |
| Grade | Points | WAG |
| A | 4.0 | 93-100 |
| A- | 3.7 | 89-92 |
| B+ | 3.3 | 86-88 |
| B | 3.0 | 81-85 |
| B- | 2.7 | 78-80 |
| C+ | 2.3 | 76-77 |
| C | 2.0 | 74-75 |
| C- | 1.7 | 72-73 |
| D+ | 1.3 | 71 |
| D | 1.0 | 70 |

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| --- | --- | --- |
| **CS221** | **Winter 2019** |  |
|  | **M** | **R** |
| **week 1** | **1.1, 1.2** | **1.3, 1.4** |
| **week 2** | **1.5 , 1,6** | **1.7, 1.8** |
| **week 3** | **free** | **2.1, preparation for Q1** |
| **week4** | **Quizzes 1, 2.2** | **2.3, 2.4** |
| **week 5** | **2.5, 4.1** | **4.3** |
| **week 6** | **preparation for MT** | **Midterm exam** |
| **week 7** | **5.1, 5.2** | **6.1, 6.2** |
| **week 8** | **6.3, 6.4, preparation for Q2** | **Quizzes 2, 8.1** |
| **week 9** | **8.2** | **9.1** |
| **week 10** | **9.3, 9.5** | **preparation for final** |
| **week 11** | **Final** |  |