WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

COMP SCI 240 section 001 Syllabus
Introduction to Discrete Mathematics

COURSE INFORMATION

Introduction to Discrete Mathematics
COMP SCI 240 001 (3 Credits)
2019-2020 Fall [1202]

Description
Basic concepts of logic, sets, partial order and other relations, and functions. Basic concepts of mathematics (definitions, proofs, sets, functions, and relations) with a focus on discrete structures: integers, bits, strings, trees, and graphs. Propositional logic, Boolean algebra, and predicate logic. Mathematical induction and recursion. Invariants and algorithmic correctness. Recurrences and asymptotic growth analysis. Fundamentals of counting. Enroll Info: None

Prerequisite(s)
MATH 217, 221, or 275

Breadths
N - Natural Science

Instruction Mode
Classroom Instruction

Section Level Com B
False

Department: COMPUTER SCIENCES
College: Letters and Science

Canvas Course URL

https://canvas.wisc.edu/

2019-2020 Fall [1202]
Term Start Date: Wednesday, 4-Sep-2019 **Term End Date:** Friday, 10-Jan-2020

Location and Schedule: Brogden Psychology Building 105 MWF 9:55 AM-10:45 AM
CRN: 266011630

How the Credit Hours are Met
This class meets for three 50-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of classroom for every class period. The syllabus includes additional information about meeting times and expectations for student work.

INSTRUCTORS AND TEACHING ASSISTANTS

Instructor

Beck HASTI
✉ HASTI@CS.WISC.EDU

Instructor Availability

Office hours (in 5375 CS):

- Monday 11 am - noon
- Tuesday 12:30 - 2:30 pm
- Wednesday 3:30 - 4:30 pm
- *and by appointment*

TA Office Hours

TA office hours are determined in the first two weeks of classes. Once they are determined, they will be posted on Canvas.

GRADING AND COURSE MATERIALS

Course Learning Outcomes (CLOs)

1 Be able to construct proofs by induction to prove properties in a variety of domains (mathematical formulas, recursively-defined structures, loop invariants, correctness of recursive programs).
[S6992]

2 Apply basic combinatoric techniques to counting problems.
[S6993]

3 Develop basic skills to construct mathematically rigorous arguments and proofs.
[S6995]

4 Gain exposure to the basics of program analysis (program correctness, recurrences, asymptotic analysis).
[S6996]

5 Demonstrate a familiarity with and an ability to reason about discrete structures/data types (integers, strings, bit strings, sets, relations, functions, graphs, trees).
[S7000]

Grading

Final letter grades are determined from your final cumulative score that is computed using the following breakdown:

- **60% Exams :**
  3 exams, 2 during the semester and one during the final exam period each worth 20% of your final grade
- **35% Assignments :**
  350 points coming from written work, on-line Canvas quizzes, and zyBooks Challenge Activities divided into approximately 14 assignments (with the first worth 10 points and the rest between 20 and 30 points each)
- **5% Participation :**
  zyBook Participation Activities, scheduled to be due prior to that material being covered in lecture

Letter grades are assigned at the end of the semester. The curve is determined after the final exam is completed. The median student's course grade is anticipated to be a low B or high BC.

Discussion Sessions

Each student attends one discussion section a week. In discussion section the student has the opportunity to get more practice with concepts in the course and solving problems under the direction of one or two TA instructors. Attendance is not required, however, a student can earn 2 assignment points for each discussion section attended. A student must attend the discussion section for which they are registered; missed discussion sections may not be made up.

Required Textbook, Software, & Other Course Materials

Course content comes from many sources: lecture, on-line readings, zyBook e-text, discussion worksheets, course web site, Piazza discussions.

The on-line readings are available on the Canvas site for this course.

Instructions for registering for the course zyBook are available on the Canvas site for this course.

EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

Exams, Quizzes, Papers & Other Major Graded Work

There are three exams worth a total of 60% of the final grade:

- **Exam 1 (20%):** Monday, October 14th, 7:15 pm to 9:15 pm
- **Exam 2 (20%):** Monday, November 11th, 7:15 pm to 9:15 pm
- **Exam 3 (20%):** Thursday, December 19th, 7:25 pm to 9:25 pm

The first two exams are during the semester, in the evenings; the third exam is during the summary period. The exams are all unit exams (i.e., not cumulative).

Students must notify the instructor (via an on-line form available on Canvas) of conflicts with any exam during the first three weeks of class.

Unless otherwise stated:

- All exams are written on paper and are closed book and closed notes.
- No calculators or other electronic devices are allowed during exams.

Homework & Other Assignments

Assignments

There are 14 assignments due approximately weekly, worth 35% of the final grade. The assignment portion of the grade is out of a max of 350 points:

- the first assignment is worth 10 points
- the rest of the assignments are worth between 20 and 30 points each

Each assignment may contain:

- zyBooks Challenge Activities
- on-line quizzes
- written homework

zyBooks Participation

5% of the final grade comes from completing zyBook Participation Activities. The activities have been divided into 20 equally weighted sections, each with a due date. Attaining an average of 80% (or better) for the participation activities will result in the student earning the full 5%.

Deadlines

A tentative schedule of due dates is available on Canvas.

Policies

Full information about late policies, submission procedures, and academic conduct expectations are provided on Canvas.

OTHER COURSE INFORMATION

Other Course Information

Lectures

- **Lecture 1:** 105 Psychology, MWF: 9:55 am - 10:45 am
- **Lecture 2:** 132 Noland, MWF: 1:20 pm - 2:10 pm
- **Lecture 3:** 168 Noland, MWF: 2:25 pm - 3:15 pm

URLs (in addition to Canvas)

- piazza.com/wisc/fall2019/compsci240
- learn.zybooks.com
- pages.cs.wisc.edu/~cs240-1 (includes info about getting started and serves as a place to post updates if Canvas is down)

Topics

The following is a tentative schedule of the topics to be covered (with the approximate number of weeks in parentheses):

- intro and course overview (0.5 week)
- propositions and predicates (1)
- sets (1)
- proof techniques (1)
- induction (1)
- invariants (0.5)
- program correctness (1)
- recursion and structural induction (1)
- recurrences (1)
- asymptotic analysis (1)
- functions and relations (1)
- finite automata and regular expressions (1)
- graphs and trees (1.5)
- counting (1.5)

ACADEMIC POLICIES

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to
https://conduct.students.wisc.edu/academic-integrity/

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA."
http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php

DIVERSITY & INCLUSION

Institutional statement on diversity: "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world." https://diversity.wisc.edu/