

CS241 Syllabus - Analysis of Algorithms - Spring 2020

Class Meeting Time: MW, 1:30 to 2:45 pm, SP 201

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| Professor: | Jenny Walter |
| Prof's Email: | jewalter at vassar dot edu |
| Prof's Office: | SP 306 |
| Prof's Office hours: | MW from 11 am to 1 pm |
| Course website: | https://www.cs.vassar.edu/~cs241/ |
| Coach: | TBA |

Textbook

Introduction to Algorithms, 3rd ed., Cormen, Leiserson, Rivest, and Stein (CLRS), MIT Press, 2009. This book can be found on-line or purchased from the bookstore or other sources.

Pre-requisites

CMPU102 and CMPU145.

Course Goals

By the end of the semester you should:

- be familiar with fundamental algorithmic problems and solution techniques,
- be able to decide which algorithm among a set of possible choices is the most efficient solution,
- be able to prove correctness and to analyze the asymptotic running time of a given algorithm,
- be able to design efficient algorithms for new problems,
- be able to show whether a problem is one that has a polynomial time solution or to show that no polynomial time solution exists to solve the problem, and
- be able to write assignments using the \LaTeX scientific typesetting language (if possible).

Course Content and Order of Lecture Topics (subject to change)

- Introduction and Mathematical Fundamentals - Chapters 1, 2, 3, and 4
- Sorting - Chapters 2, 6, 7, and 8
- Medians and Order Statistics - Chapter 9
- Hash Tables - Chapter 11
- Binary Search Trees - Chapter 12 and 13
- Dynamic Programming - Chapter 15
- Data Structure for Disjoint Sets (Union-Find) - Chapter 21
- Basic Graph Algorithms - Chapters 22, 23, 24, and 25
- NP-Completeness and Approximation Algorithms - Chapters 34, 35

Grading

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| First Exam (around Feb. 26 th) | 20% |
| Second Exam (around Apr. 15 th) | 20% |
| Third Exam (during last week of classes) | 20% |
| Assignments and Projects | 30% |
| Course Participation | 10% |

The dates of the first two exams may be subject to change. Any changes will be discussed in class before the dates given. No solutions for assignments will be accepted without an excused absence after graded solutions are handed back. Check your e-mail frequently for course announcements.

Requirements for the course consist of three exams, written assignments, programming projects, and class participation. You are responsible for keeping up with the reading and for all material covered in class (some of which may not be in the book or the posted lecture notes). If you miss a class for any reason, you are responsible for making arrangements with classmates to provide you with information from class that day. No make-up exams will be given unless you present an official excuse from Baldwin, the Dean of Studies, or get advance permission to take the exam at a different time from your professor. Course participation includes attending class and seeing your professor during office hours.

Exams

As shown above, there will be 3 exams in this course. The first two may be take-home or in-class exams with open-book, open-note format. The third will be a take-home exam.

Lectures

Lecture notes will be posted on the course web page. Posted lecture notes may include examples not covered in lecture and vice versa.

Rules for Assignment Preparation and Submission

One goal of this course is to develop your facility to create and analyze algorithms, so individual completion of assignments is extremely important. Assignments and due dates are included as they are determined on the course web page. You are encouraged to see your professor with any questions.

- One point will be deducted from the overall score for each day an assignment is late with no valid excuse and one point deducted for any assignment with no name typed or written on it.
- One point of extra credit will be given to assignments created with L^AT_EX software, with the exception of any programming project solutions, which should be submitted as text files and as executable code.
- Your final solution must be clearly indicated, you should show all the steps used to arrive at each solution, and you should always show your solution directly below the question. Template `.tex` files will be posted for all written assignments.
- The solutions you produce should either be handed in on paper or be submitted in a single folder. The submission script is

submit241 w-asmt1 asmt1

where `w-asmt1` is the directory you are submitting to and `asmt1` is your directory containing the `.tex`, `.pdf`, `.java`, `.class`, and any other files you used for the assignment.

Ask your professor about using the L^AT_EX software, including questions about errors you get when typesetting.

Academic accommodations

Academic accommodations are available for students with disabilities who are registered with the Office of Disability and Support Services. Students in need of disability accommodations should schedule an appointment with the professor early in the semester to discuss any accommodations for this course which have been approved by Office of Disability and Support Services, as indicated in your DSS accommodation letter.

Title IX Statement

See Vassar College statement on providing a safe learning environment at

<https://eoaa.vassar.edu/title-ix/>