EECS 660 Fundamentals of Computer Algorithms

Instructor: Cuncong Zhong; Email: cczhong@ku.edu
Grader: Ronald Moore; Email: romoore@ku.edu
Class meeting: TR 8:00-9:15 Eaton 2
Office hours: 2026 Eaton Hall, TuTr 9:30AM-10:30AM or by appointment

Course overview

EECS 660 Fundamentals of Computer algorithms is an intermediate-level algorithm course, between EECS 560 Data Structure and EECS 764 Analysis of algorithms. This course exposes the students with how they can utilize rigorous computational approaches to solve more realistic and sophisticated problems, and prepares the students with fundamentals of algorithms that allow them to study more advanced topics in algorithm. In this course, a series of classical (and very important) algorithms will be introduced to the students such as shortest path, minimum spanning tree, string edit distance *etc*. With these algorithms, the students are expected to familiarize with common algorithm design schemes such as greedy, divide-and-conquer, dynamic programming *etc*. and establish ability to analyze the correctness and efficiency of the algorithms.

Prerequisite of the course

EECS 560 (Data Structure): This course is built from EECS 560. Many topics introduced in EECS 560 are essential for the understanding of this course, e.g. queues, stacks, trees, graphs *etc*. These topics will be briefly re-introduced in this class but will not be discussed intensively. Reviewing these topics will help the understanding of this course.

EECS 461 (Probabilities and statistics) or MATH 526 (Applied mathematical statistics): EECS 461 or MATH 529 is not essential for most topics of this course; however, they may be helpful for understanding some advanced topics of the course.

Topics covered

- Big-O notation and analysis of computational complexity
- Graph and graph traversal algorithm
- Greedy algorithm
- Divide-and-conquer algorithm
- Dynamic programming algorithm
- Network flow algorithm
- NP and computational tractability
- Other topics (branch-and-bound, local search, approximation algorithm, and randomized algorithm; subject to change)

Book

Algorithm design, by Kleinberg and Tardos, Addison Wesley Press, 2005, ISBN-13: 978-0321295354
Other books recommended:
Algorithms, by Sedgewick and Wayne, Addison Wesley Press, 2011, ISBN-13: 978-0321573513
Introduction to Algorithms, by Cormen, Leiserson, Rivest, and Stein, MIT Press, 2009, ISBN-13: 978-0262033848

Grading (No +/- system will be used)

- Attendance: 10% (5 random in-class sign-ins)
- Homework: 10% * 6
- Final exam: 30%

- A: >=90%
- B: 80-89%
- C: 70-79%
- D: 60-69%
- F: below 60%

General Course Information

1. You are strongly encouraged to attend all lectures. Attendance may be taken in random lectures. If you miss a lecture due to illness, bring a doctor's note to us and we will record the absence as excused.
2. Any unauthorized absence from an exam will result in a zero for that exam. **If you come in late after an exam has already begun, you will not be allowed any extra time to complete your exam.**
3. Occasionally you may not understand why points have been deducted from your assignment or exam. If so, you should come to see us. We will re-grade your whole assignment, or exam, if, and only if, you contact us within 5 days after it has been returned in class. **No assignment, or exam, will be re-graded after it has been returned for more than 5 days, regardless of whether you were in class that day or not.**
4. We are not responsible for any assignment, or exam, that you do not pick up after they have been returned in class.
5. Keep all copies of your work. **If you dispute any score recorded, you must bring in your original work for verification in order to have it changed.**
6. **Cheating will not be tolerated.** All submitted work must be strictly your own; there is no group project/assignment in this course. Sharing your work or copying is cheating, and submitting work that is not all yours, independent of your source(s), is also considered cheating. Anyone caught cheating will be given an F grade for the course for all parties involved. Reports of academic misconduct will also be made to your major department, school/college, and university, which may result in much more serious sanctions. **It is your responsibility not to let anyone copy your assignment/exam; otherwise, you will have to pay the price for others' misconduct.**
7. As stated in the Undergraduate Catalog, procedures for withdrawing from a course are governed by the academic unit offering the course, not the academic unit to which a student belongs. If you choose to withdraw from this course, you should refer to the regulations outlined in the Catalog and the Timetable.

Academic Achievement & Access

Any student in this course who has a disability that may prevent him/her from fully demonstrating his/her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate the educational opportunity. The Academic Achievement & Access Center (AAAC) coordinates accommodations and services for all KU students who are eligible. If you have

a disability for which you wish to request accommodations and have not contacted the AAAC, please do so as soon as possible. Their office is located in 22 Strong Hall; their phone number is 785-864-4064 (V/TTY). Information about their services can be found at http://disability.ku.edu. Please contact me privately in regard to your needs in this course.

Exam Policy

1. Unless otherwise stated, all material from the assigned readings, lecture notes, and assignments are fair game for exams.
2. You must write your name and KU ID number on the cover page of the exam.
3. **All exams are closed book, closed notes**, and will be held in our regular lecture room.
4. **Your work must be clean, neat, and legible. If we cannot read it, it will not be graded.**
5. All exams should be written with non-erasable pens; no pencil is allowed. Scratch paper will be provided for exams.
6. Except medical device(s), no calculators, cell phones, head phones, or electronic devices of any sort will be allowed. No such devices should be out in the open.
7. **You must write legibly and show all your work clearly for credit. Partial credit will only be given to meaningful answers.**
8. You must write on only one side of the page. **Any work on the back of a page will not be graded.**
9. You will be graded according to your approach to the problems, mathematical rigor, and quality of your solutions. No credit will be given for unjustified incorrect answers; unjustified correct answers are also subject to a possible point deduction. A correct but inefficient algorithm will receive very little credit in this course.
10. If algorithm is required in your solution, you must first explain your algorithm **in plain English and then present it in pseudo code**. Although no formal proof is usually required, unless specified otherwise, you must also justify the correctness of your algorithm.
11. Variables must be defined clearly before use. Undefined variables or inconsistent definitions will result in possible point deduction.
12. In cases where curving is necessary, the median will be curved to 80%. No score after curving will exceed 100%. No score will be curved down.