Class Information

Course Title: Analysis of Algorithms
Course Number and Section: CPS 3440 03
Campus Location: KEAN UNION
Semester: 2025FA
Class Meeting Days and Times: M W From 14:00 To 15:15

Instructor Information

Instructor Name: Yan Ma
Office Location: GLAB 237
Office Hours: M/W: 10:30 AM – 12 PM and T/TH: 11 AM – 12 PM
Email: yama@kean.edu

*I am available to meet with you via Teams, phone or in person. To make an appointment, please download the Navigate360 app and use the Appointment option. Step-by-step instructions are available here.

Course Description from Catalog

Algorithmic analysis techniques. Algorithms involving advanced data structures, sorting, trees, and graphs. NP-Completeness.

CPS*2232

Course Level Student Learning Outcomes

Upon successful completion of this course, the student will be able to:

- A. Understand the need for analyzing the efficiency of an algorithm.

- B. Analyze algorithms in order to determine their complexity.

- C. Understand the difference between inefficient algorithms and "hard" problems.

- D. Develop a repertoire of useful algorithms.

Instructional Technique(s)

Instructional Methods: Lectures, class discussions, examinations, and homework or project-based assignments.

Required Texts and Materials

Introduction to Algorithms
978-0-262-04630-5
Cormen, Leiserson, Rivest, and Stein
MIT Press
2022
4th edition

Your campus bookstore offers a Price Match guarantee. If you find your class texts cheaper at Barnes & Noble.com or Amazon.com, the campus bookstore will match the price at the time of purchase or up to 7 days after purchase. The book has to be sold and shipped from Barnes & Noble.com or Amazon.com and not a 3rd party seller or marketplace. It also has to be in stock at the bookstore and on either platform. Search for your course materials by the ISBN provided in this syllabus to ensure that your price match is acceptable. We also offer RENTALS on New & Used textbooks which saves up to 80% over purchasing. At the end of the semester during finals week until the last day of finals, there's Buyback where you can sell your textbooks back for up to 50% of what the bookstore sold it for provided it will be used for the following semester.

Topics and Assignments

Week/Unit	Topics	Assignments Due
Unit 1 / Course Introduction: The role of algorithms in computing and Foundations review	Textbook Chapters 1, 2, 3, Appendices	Homework 1: 35 Points
Unit 2 / Recursive Functions. Divide-and-Conquer. The Master Theorem.	Chapter 4	Homework 2: 35 Points
Unit 3 / Sorting and Searching Review. Elementary Data Structures Review.	Chapters 10, 12	Homework 3: 35 Points
Unit 4 / Elementary Tree and Graph Algorithms Review	Chapter 20	
Unit 5 / Sorting and Searching: Mergesort, Heapsort, and Quicksort Review	Chapters 3, 6, 7	Homework 4: 35 Points
Unit 6 / Sorting in Linear Time: Counting Sort, Radix Sort, and Bucket Sort	Chapter 8	Homework 5: 35 Points
Unit 7 / Median and Order Statistics	Chapter 9	**Exam on Units 1-7**: 300 Points
Unit 8 / Dynamic Programming. Properties and Strategy. Analysis. Limitations.	Chapter 14	Homework 6: 35 Points
Unit 9 / Dynamic Programming. Greedy Algorithms. String Matching.	Chapters 15, 32	Homework 7: 35 Points
Unit 10 / Graph Algorithms. Data Structures for Graphs. Topological Sort. Strongly Connected Components.	Chapter 20	
Unit 11 / Minimum Spanning Trees	Chapter 21	Homework 8: 35 Points
Unit 12 / Shortest Paths Algorithms	Chapter 22	Homework 9: 35 Points
Unit 13 / Graph Algorithms: Minimum Cuts	Chapter 24	
Unit 14 / Graph Algorithms: Maximum Flows and Bipartite	Chapters 24, 25	Homework 10: 35 Points

Matching		
Unit 15 / NP-Completeness	Chapters 34, 35	**Exam on Units 8-15**: 300 Points
	Attendance	Attendance (in total): 50 points
		Total: 1000 Points

Important Dates

For important dates, please consult the Academic Calendar via the following link:
https://www.kean.edu/offices/registrars-office/academic-calendar

Technology Requirements

Canvas
You will use Canvas as your Learning Management System (LMS) in this class. Announcements, assignments, and often other course materials are available on the course Canvas site. You will be able to access your grades at all times in the course Canvas Grade Center. If you need any Canvas support, you will find resources in this Student Guide to Canvas, and you can access Canvas help 24 hours a day, 7 days a week via Live Chat.

Hardware and Software Support
Find all of the technology platforms you have access to as a Kean student at the myApps Launchpad.
If you need help with any technology questions, you can find answers at the Kean Help Desk.

Email
All students must have a valid Kean email account. Please only communicate with me using your Kean email address.

Laptops
If you need a short-term loaner laptop, please visit the Learning Commons Technology & Equipment page. These devices are located at the front desk of the Learning Commons.

Assessment

Final grades will be based on the total points earned from two exams, ten homework assignments, and class attendance, as outlined below:

- **Exams (2):** 60% of the final grade (30% each)
- **Homework Assignments (10):** 35% of the final grade (3.5% each)
- **Attendance:** 5% of the final grade

Late Submission Policy

Students are strongly advised to submit all assignments on time. Late submissions will be penalized as follows:

- Submitted within 24 hours after the deadline: **10% deduction** from the earned grade
- Submitted between 24 and 48 hours after the deadline: **40% deduction** from the earned grade
- **Submitted more than 48 hours after the deadline: Will not be accepted or graded**

No exceptions will be made unless there are serious circumstances supported by proper documentation.

Academic Integrity and Expectations for Generative AI

Academic Integrity
Students are responsible for reviewing and understanding the University Academic Integrity Policy available via the following link: https://www.kean.edu/academic-integrity. Students are expected to submit their original work. Any use of generative AI - is subject to the same citation rules as any ideas, text, speech, or imagery derived from human authors as outlined in the Academic Integrity Policy. Instructors must indicate on the syllabus and/or individual assignment if the use of Kean University Learning Support Services (*Tutoring and/or Writing Center*) is permitted for take-home assignments/exams.

Expectations for AI Use
Students are required to abide by the expectations for AI use outlined in Kean's Academic Integrity Policy. In summary, all courses follow the below expectations:

- **Originality**: Content created by AI cannot be presented as original student work.
- **Citation and Attribution**: In courses where AI use is permitted, any content generated by AI must be cited. Guidelines for citations can be found here.

- **Integrity**: Students are accountable for the accuracy and appropriateness of any content they create or publish, including AI-generated material.
- **Consequences:** Use contrary to the course policy and/or without proper acknowledgement is subject to the same rules and consequences outlined for integrity violations. Faculty may use various tools to check for AI, including: comparisons with other work, AI detection tools, verbal demonstration of mastery of content, and other relevant forms of evidence.

NOTE: If your instructor has additional (course specific) expectations related to AI use, they will be outlined in the next section of this syllabus.

Academic Alerts

Academic Alerts and Campus Referrals

Academic Alerts provide you with ongoing feedback on how you are performing in your classes. Your professor may contact other offices on campus via an Alert to provide you additional support. These alerts, sent via Navigate360, are not a grade and not reported in your permanent academic record. If you get an alert, it will give you instructions about what to do next.

For more information, please see the Undergraduate or Graduate Catalog.

Academic Policies

Photo ID
All Kean students are expected to have and carry a Kean photo ID. If you need to obtain an ID card, more information can be found here.

Attendance
Attendance is expected in all courses. Students are responsible for informing the instructor in advance or in a timely manner of the reasons for their absence. Typically, excused absences include illness, bereavement or religious observances. Serious tardiness may be dealt with at the discretion of the instructor. For further information regarding withdrawal and health and wellness absences (including student bereavement leave), please see the Office of the Registrar's website.

Video Recording of Class Sessions
In this course, class sessions may be recorded to comply with the Americans with Disabilities Act (ADA) and to support the learning process. Software may be used to record live class discussions and/or remote sessions. As a student in this class, your

participation in these sessions may be recorded. Recordings will be accessible only to students enrolled in the class for the duration of the course and will be deleted or made unavailable when the course concludes. Students are not permitted to create video or audio recordings of the course—including AI-generated transcripts—without permission from the instructor and other students. If you require course recording as an accommodation, contact Kean's Office of Accessibility Services. Recording may be used solely for internal class purposes and may not be posted or shared outside of the class.

Student Code of Conduct
Students should review the Student Code of Conduct, as it discusses expectations of appropriate conduct in the classroom. Contact the Office of Accountability, Standards and Education by phone at (908) 737-5240 or by email at conduct@kean.edu.

Emergency Notifications
Students are automatically registered for the University's emergency notification system (http://www.kean.edu/campusalert) through the contact information included in KeanWISE. This system enables university community members to be informed of campus emergencies, weather notices, and other announcements. Kean Ocean students would sign up via the following link: https://ocean.sendwordnow.com/LicensePage.aspx

Course Policies

Provide Course Policies, if necessary, such as participation, etc. in addition to the following:

Class Recordings (Live Sessions/Collaborate)- if applicable

In this class software may be used to record live class discussions. As a student in this class, your participation in live class discussions will be recorded. These recordings will be made available only to students enrolled in the class, to assist those who cannot attend the live session or to serve as a resource for those who would like to review content that was presented. All recordings will become unavailable to students in the class when the course is closed.

Students are not permitted to record (or download) the course experience. If a recording of the course is required for accommodation purposes students must make those arrangements with the Office of Accessibility Services. Students found to have recorded (or downloaded) course experiences without authorization are subject to review by the Office of Student Conduct and Community Standards.

Privacy Statement

Assuring privacy among faculty and students engaged in online instructional activities helps promote open and robust conversations and mitigates concerns that comments made within the context of the class will be shared beyond the classroom. As such, recordings of instructional activities occurring in online classes may be used solely for internal class purposes by the faculty member and students registered for the course, and only during the period in which the course is offered.

Department Examination Conduct Policy

The Department of Computer Science and Technology provides classroom examinations in the following modalities, as specified by the instructor: paper examinations, oral examinations, and online LMS exams, which may use the Lockdown Browser in a timed environment.

Students are NOT permitted to use headphones, mobile phones, or any other electronic devices during the examination unless explicitly permitted by the faculty member.

Once the exam period begins, students cannot leave the room and later return to their exam. Departure from the exam room signals the conclusion of the exam for that student and the exam paper must be turned in for paper exams; the Canvas session concludes for electronic exams.

Kean University's academic integrity policy can be found here.

Nancy Thompson Learning Commons

Location: *Nancy Thompson Library building*
Email: *learningcommons@kean.edu*
Learning Commons Website: *learningcommons.kean.edu*
Learning Support Services Appointments: *tutoring.kean.edu*

The Nancy Thompson Learning Commons is your gateway to academic success, offering research support, personalized tutoring, writing support, extensive library collections, and expert guidance to empower your learning.

Library Resources
Access a wide range of digital and print materials, including Open Educational Resources (OERs), tailored to support your academic journey.
Research Support
Librarians are available to help you build research and information literacy skills. Schedule a consultation via the Research Support page or tutoring.kean.edu.

Workshops
Learn essential academic skills—from time management and citations to exam prep and critical thinking. View upcoming sessions on the <u>Learning Commons Workshops and Events page.</u>
Learning Support Services
Receive comprehensive academic support, including subject tutoring, academic coaching, public speaking practice, Supplemental Instruction (SI), embedded tutoring in GE courses, and writing guidance through the Writing Center—all designed to help you succeed and grow as a learner. Book services at <u>tutoring.kean.edu</u>.

Student Support Services

Kean University offers several support services for students. Please visit Kean University Student Support Services for more information in any of the areas listed below. You can also *Submit a Hand Raise* via Navigate360, connecting you with support services and campus resources. Check out THIS video tutorial for instructions.

Diversity & Non-Discrimination Statement

Kean University is dedicated to fostering excellence through access. Our campus-wide commitment empowers every individual to thrive in diverse classrooms and succeed in a global workforce. We promote empathy and respect across all levels of our community, including students, faculty, staff, administrators, and the broader public. For further information on Kean's initiatives, policies, and procedures, including support for protected communities, please visit the webpages of the Office of Affirmative Action Programs and Human Resources.

Faith and Spirituality Statement
In alignment with our commitment to fostering a respectful and welcoming environment, Kean University supports students' rights to be excused from classes due to reasons of faith and spirituality, without academic penalty. Students are encouraged to proactively communicate with instructors to make alternative arrangements for coursework that conflicts with religious observances.
During business hours students, faculty, and staff who wish to engage in prayer or meditation are invited to use:

Religious Plural Prayer and Meditation Room in Townsend 116E
Muslim Prayer Room in Center for Academic Success (CAS) 442

Americans with Disabilities Act Statement

Once students are registered with the Office of Accessibility Services and approved for accommodations, they must present their Letter of Accommodation to their instructors via email or in person at the beginning of each semester. Please note, accommodations become active when the Letter of Accommodation is presented to the faculty member. Accommodations are not retroactive, so it is important that you submit your letter as early as possible. Students are encouraged to contact their instructors to schedule a confidential meeting to discuss how accommodations can support them in understanding the course learning objectives and fulfilling the course requirements.

Office of Accessibility Services
The Office of Accessibility Services is committed to ensuring equal access by fostering an accessible learning environment. Our office provides assistance and accommodations for all students with documented temporary and permanent physical, medical, learning, emotional, and/or physical disabilities. You can contact the office to schedule an initial appointment in person at the Kean Wellness Center, Downs Hall 122, by phone at (908) 737-4910 or by email at accessibilityservices@kean.edu. Please visit the [Office of Accessibility Services website](#) for additional information.

Accommodation Renewals
Students are required to work with the Office of Accessibility Services to renew their accommodations at the start of a new semester. Renewals are processed in the student portal.

Title IX Statement

Title IX of the Education Amendments of 1972 (Title IX) prohibits discrimination on the basis of sex in education programs or activities. Sex discrimination, which includes discrimination based on sex stereotypes, sex characteristics, pregnancy or related conditions, sexual orientation, gender identity and sex-based harassment, will not be tolerated at Kean University. Incidents of sexual discrimination should be reported to the Title IX Coordinator immediately.

Kean University is committed to providing a fair and impartial process for all parties involved. This includes supportive measures, a thorough investigation, and equitable resolutions.

For more information about the University's Title IX Policy and the rights and resources available to you, please visit Sexual Discrimination Policies and Procedures. For more

information on Title IX, please see this link.

In the event that you choose to write or speak about having experienced sexual misconduct, including sexual assault, dating violence, domestic violence, stalking, sexual exploitation or any other form of sexual and/or gender-based harassment, as a mandated reporter, I must notify the Title IX Office. They will contact you to let you know about accommodations and support services at Kean and reporting options both on and off campus. You have no obligation to respond to the Title IX Office or to meet with them to discuss support services and reporting options.

Additional Course Policies

Technology Usage Policy:

All phones need to be turned to "silent mode" and placed out of sight prior to class beginning. You may not make or take a phone call, text or access the internet during class or a test. Classes may not be audio or digitally captured, unless permission has been granted by the instructor for that specific class. Usage of electronic device in class may result in points deduction. Any student who has their phone out during an exam or quiz will automatically have to turn in their exam and may be referred to the office of student misconduct.

Public posting of course materials from this class is prohibited. Materials presented in the classroom are for the personal use of registered students during the semester only. Homework, programs, and other classwork should not be shared, distributed or publicized in any way, for the protection of other students and in respect of the intellectual property rights of the faculty and copyright owners. Kean University's Academic Integrity Policy can be found here: https://www.kean.edu/media/academic-integrity-policy

Canvas Digital Gradebook

The Canvas grade book is being used this term, for prompt feedback on your work. As soon as grades are posted, you will be notified immediately so that you can log in and see your feedback.