

COURSE CHANGE REQUEST Graduate Programs

Department Electrical Engineering and Computer Science

College Engineering and Computer Science

2 Engineering at	Catalog		
Current Course	Current Course Title		
Prefix and Number COT 6446	Randomized Algorithms		
Syllabus must be attached for ANY changes to that may be affected by the changes; attach do	current course details. See <u>Template</u> . Please consult and list depo ocumentation.	ırtments	
Change title to:	Change description to:	Change description to:	
Change prefix			
From: To:	Change prerequisites/minimum grades	to:	
Change course number		COP 3530 or COP 3410 or permission of instructor	
From: To:	COL 3330 OF COL 3410 OF PERMISSION O	i ilistructor	
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Academic Service Learning (ASL) **			
Add Remove			
* See <u>Definition of a Credit Hour</u> . ** Academic Service Learning statement must be is syllabus and approval attached to this form.	ndicated in Please list existing and new pre/corequisites, specif and include minimum passing grade.	Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade.	
ffective Term/Year Terminate course? Effective Term/Year for Termination:			
Faculty Contact/Email/Phone Hanqi Zhua	ng / zhunag@fau.edu / 561-297-3413		
Approved by	Date		
Department Chair	11/28/202	2	
Conege Curriculum Chair	el-Moreno Digitally signed by Francisco Pressul-Moreno Disconin Francisco Pressul-Moreno Que, email-spressuelgifau.edu, c=US Date: 2022.11.28.13:50-46-0900' Date: 2022.11.28.13:50-46-0900'	2	
College Dean Mihaela Cardei			
UGPC Chair Mihaela Cardei (Dec 19, 2022 10:21 EST)			
UGC Chair			
Graduate College Dean from wft my			
UFS President			
Provost			

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.



Course Description

This course introduces several basic techniques in the design and analysis of randomized algorithms and their applications.

Instructional Method

A brief statement about the Instructional Method and the expectations for student attendance in the class will be included here. For a list of the Instructional Methods and their definitions, see https://www.fau.edu/registrar/courses/Instru_Method.php

Prerequisites

COP 3530 or COP 3410 or permission of instructor

Course Objectives/Student Learning Outcomes

Course objectives (CO)

Upon successful completion of this course, students will be able to learn the power of randomness in computer science, and how to design and analyze randomized algorithms:

- 1. An ability to identify, formulate, and solve complex computing/engineering problems by applying principles of computing, engineering, science, and mathematics.
- 2. An ability to apply the computing/engineering design process to produce solutions that meet a given set of computing/engineering requirements with consideration for public health and safety, and global cultural, social, environmental, economic, and other factors as appropriate to the discipline.
- 3. An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge.

Course Evaluation Method

5 Homework Assignments (each worth 14%) – 70% Final Examination or Project – 30%

For the project, students must first identify a related topic, either from the textbook or research papers, and get approved by the instructor. Then they should present the essential/novel ideas and technical contributions. Students should submit a final report for the project.

Course Grading Scale

90 and above: "A", 87-89: "A-", 83-86: "B+", 80-82: "B", 77-79: "B-", 73-76: "C+", 70-72: "C", 67-69: "C-", 63-66: "D+", 60-62: "D", 51-59: "D-", 50 and below: "F."

Policy on Makeup Tests, Late Work, and Incompletes (if applicable)

Students are strongly suggested to inform the instructor in advance in the case of emergency (if possible). Makeup exams are given only if there is solid evidence of a medical or otherwise serious emergency that prevents the student of participating in the exam.

Students must turn in homework, assignment and projects on time. Students will lose 25% (after 1 day) and 50% of marks (after 2 days) if they turn in late. Submissions are not accepted after 2nd day of due date.

Special Course Requirements (if applicable)NA

Classroom Etiquette Policy (if applicable)NA

Policy on the Recording of Lectures

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

Attendance Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military

obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

Disability Policy

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see <u>University Regulation 4.001</u>.

Required Texts/Readings

Probability and Computing: Randomization and Probabilistic Techniques in Algorithms and Data Analysis 2nd Edition

By Michael Mitzenmacher and Eli Upfal. Cambridge University

Supplementary/Recommended Readings (if applicable)NA

Course Topical Outline

Weekly Schedule	Topics	
Week o1	Introduction: the power of randomness in computer science	
Week 02	Background of (discrete) probability: random variables, expectations, applications to Quicksort	
	HW1	
Week o3	Applications to Coupon Collection Problems and Stable matching.	
Week 04	Chebyshev's Inequality and applications to Find Medium	
	HW2	
Week o5	Chernoff Bounds and Applications to Parameter Testing	
Week o6	Chernoff Bounds and Applications to Error Reduction	
Week 07	Hash Functions, Pairwise Independence, and applications to randomness efficient designs	
	HW ₃	
Week o8	Cryptographic Applications I: semantic security, collision resistance, computational indistinguishability, and pseudorandomness	
Week og	Cryptographic Applications II: interactive proofs, zero-knowledge proofs,	
	Project Topic Selection	
Week 10	Cryptographic Applications III: secure multiparty computation, Ideal-Real paradigm	
Week 11	The probabilistic method, an introduction	
	HW4	
Week 12	The probabilistic method, applications	
Week 13	Random Process, an introduction	
Week 14	Random Process, applications	
	HW5	
Week 15	Other selected topics	
	Project presentation and reports submission	