

 <b>FLORIDA ATLANTIC UNIVERSITY</b>	<b>NEW COURSE PROPOSAL</b> <b>Graduate Programs</b>	UGPC Approval _____ UFS Approval _____ SCNS Submittal _____
	<b>Department</b> Computer & Electrical Eng. and Computer Sci. <b>College</b> Engineering and Computer Science <i>(To obtain a course number, contact <a href="mailto:erudolph@fau.edu">erudolph@fau.edu</a>)</i>	Confirmed _____ Banner Posted _____ Catalog _____

<b>Prefix</b> COT <b>Number</b> 6446	<i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i> <b>Lab Code</b>	<b>Course Title</b> Randomized Algorithms
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<b>Credits</b> <i>(Review Provost Memorandum)</i> 3	<b>Grading</b> <i>(Select One Option)</i>  <b>Regular</b> X <b>Sat/UnSat</b>	<b>Course Description</b> <i>(Syllabus must be attached; see Guidelines)</i> This course introduces several basic techniques in the design and analysis of randomized algorithms, and their applications.
<b>Effective Date</b> <i>(TERM &amp; YEAR)</i> FALL 2017		

<b>Prerequisites</b> COT 4400 and STA 4821, or permission of instructor	<b>Corequisites</b> N/A	<b>Registration Controls</b> <i>(Major, College, Level)</i> Graduates, Seniors (College of Engineering or College of Science)
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**Prerequisites, Corequisites and Registration Controls are enforced for all sections of course**

<b>Minimum qualifications needed to teach course:</b> Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)	<b>List textbook information in syllabus or here</b> Probability and Computing: Randomized Algorithms and Probabilistic Analysis. By Michael Mitzenmacher and Eli Upfal. Cambridge University Press 2005, ISBN 978-0-521-83540-4.
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<b>Faculty Contact/Email/Phone</b> Feng-Hao Liu, <a href="mailto:fenghao.liu@fau.edu">fenghao.liu@fau.edu</a> , 561-297-2341	<b>List/Attach comments from departments affected by new course</b> College of Science, Department of Mathematical Sciences
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<b>Approved by</b> Department Chair _____ College Curriculum Chair _____ College Dean _____ UGPC Chair _____ Graduate College Dean _____ UFS President _____ Provost _____	<b>Date</b> 3/3/17 3/7/17 3/15/17 3-29-2017 3-29-17
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Email this form and syllabus to [UGPC@fau.edu](mailto:UGPC@fau.edu) one week before the UGPC meeting.

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and Computer Science  
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Course Syllabus**

<b>1. Course title/number, number of credit hours</b>	
Randomized Algorithms COT 6446	# of credit hours = 3
<b>2. Course prerequisites, corequisites, and where the course fits in the program of study</b>	
Prerequisites: COT4400 Design and Analysis of Algorithms and STA4821 Stochastic Models for Computer Science, or permission of instructor	
<b>3. Course logistics</b>	
Term: Fall 2017 Location: TBD	
<b>4. Instructor contact information</b>	
<i>Instructor's name</i>	Feng-Hao Liu, PhD
<i>Office address</i>	Bldg. EE 96/ Room 529
<i>Office Hours</i>	TBD
<i>Contact telephone number</i>	561-297-2341
<i>Email address</i>	fenghao.liu@fau.edu
<b>5. TA contact information</b>	
<i>TA's name</i>	TBD
<i>Office address</i>	
<i>Office Hours</i>	
<i>Contact telephone number</i>	
<i>Email address</i>	
<b>6. Course description</b>	
<p>This course introduces several basic techniques in the design and analysis of randomized algorithms, and their applications. Topics include secure designs, randomized sorting, packet-routing, error-reduction, and secure protocol designs.</p> <p>Probability, randomness, statistics have been playing an important role in computer science, ranging from purely theoretical studies to highly practical applications. Research in the related fields has been extremely active since the past three decades. The course will develop essential skills for analyzing probability used in various settings in computer science.</p>	
<b>7. Course objectives/student learning outcomes/program outcomes</b>	
<i>Course objectives</i>	<b><i>To learn the power of randomness in computer science, and how to design and analyze randomized algorithms.</i></b>
<b>8. Course evaluation method</b>	
5 Homework assignments (15% each): 75% Project: 25%	For the project, students must first identify a related topic, either from the textbook or research papers, and get approved by the instructor. Then

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	they will present the essential/novel ideas and technical contributions. Students will submit a final report for the project.
<b>9. Course grading scale</b>	
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."	
<b>10. Policy on makeup tests, late work, and incompletes</b>	
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 2 <sup>nd</sup> day of due date.	
<b>11. Special course requirements</b>	
NA	
<b>12. Classroom etiquette policy</b>	
University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.	
<b>13. Disability policy statement</b>	
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)—in Boca Raton, SU 133 (561-297-3880); in Davie, LA 131 (954-236-1222); or in Jupiter, SR 111F (561-799-8585)—and follow all SAS procedures.	
<b>14. Honor code policy</b>	
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 unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at <a href="http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf">www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf</a>	
<b>15. Required texts/reading</b>	
Probability and Computing: Randomized Algorithms and Probabilistic Analysis. By Michael Mitzenmacher and Eli Upfal. Cambridge University Press 2005, ISBN 978-0-521-83540-4	

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**16. Supplementary/recommended readings**

NA

**17. Course topical outline, including dates for exams/quizzes, papers, completion of reading**

Weekly Schedule	Topics
Week 01	Introduction: the power of randomness in computer science
Week 02	Background of (discrete) probability: random variables, expectations, applications to Quicksort  HW1
Week 03	Applications to Coupon Collection Problems and Stable matching.
Week 04	Chebyshev's Inequality and applications to Find Medium  HW2
Week 05	Chernoff Bounds and Applications to Parameter Testing
Week 06	Chernoff Bounds and Applications to Error Reduction
Week 07	Hash Functions, Pairwise Independence, and applications to randomness efficient designs  HW3
Week 08	Cryptographic Applications I: semantic security, collision resistance, computational indistinguishability, and pseudorandomness
Week 09	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

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Week 14	Random Process, applications HW5
Week 15	Other selected topics Project Presentation and Report Submission

**From:** Rainer Steinwandt <srainer@math.fau.edu>  
**Sent:** Tuesday, February 21, 2017 8:16 AM  
**To:** Mihaela Cardei  
**Subject:** Re: CEECS New Course Proposal - Approval Request

Hi Mihaela,

Looks like a very nice addition to the course offering. There are no concerns from our side.

Thanks for checking,  
Rainer

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**From:** "Mihaela Cardei" <mcardei@fau.edu>  
**To:** "Rainer Steinwandt" <RSTEINWA@fau.edu>  
**Cc:** "fenghao liu" <fenghao.liu@fau.edu>, "Nurgun Erdol" <erdol@fau.edu>, "Mihaela Cardei" <mcardei@fau.edu>  
**Sent:** Tuesday, February 21, 2017 7:33:43 AM  
**Subject:** CEECS New Course Proposal - Approval Request

Dear Dr. Steinwandt,

The Department of Computer & Electrical Engineering and Computer Science (CEECS) is proposing a new courses:

*COT 6446 - Randomized Algorithms and Secure Designs*  
Please find attached the course proposal.

We would like to ask your approval, that the Mathematical Sciences has no objections to this new course proposal. Could you please review the material and email me your approval decision?

Thank you,

Mihaela

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Mihaela Cardei, PhD  
Professor and Director Graduate Studies  
Computer & Electrical Engineering and Computer Science Department  
College of Engineering and Computer Science  
Florida Atlantic University

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