FLORIDA ATLANTIC UNIVERSITY

COURSE CHANGE REQUEST
Graduate Programs

Department Computer and Electrical Eng. and Computer Sci.

College Engineering and Computer Science

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

***Current* Course Prefix and Number** COT 6200	***Current* Course Title** Philosophy of Computation

*Syllabus must be attached for **ANY** changes to current course details. See Guidelines. Please consult and list departments that may be affected by the changes; attach documentation.*

Change title to:

Theory and Philosophy of Computation

Change prefix

From: **To:**

Change course number

From: **To:**

Change credits*

From: **To:**

Change grading

From: **To:**

*Review Provost Memorandum

Change description to:

This course covers major topics in the theory of computation and their philosophical meanings.

Change prerequisites/minimum grades to:

MAD 2104 and COT 4420, or permission of instructor

Change corequisites to:

None

Change registration controls to:

Graduates, Seniors (College of Engineering or College of Science)

Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade.

Effective Date *(TERM & YEAR)* FALL 2017	**Terminate course List final active term**

Faculty Contact/Email/Phone Feng-Hao Liu, fenghao.liu@fau.edu, 561-297-2341

Approved by	***Date***
Department Chair	3/3/17
College Curriculum Chair	3/10/17
College Dean	3/10/17
UGPC Chair	3-29-2017
Graduate College Dean	3-29-17
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

Department of Computer & Electrical Engineering
and Computer Science
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Theory and Philosophy of Computation COT 6200	# of credit hours = 3
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisites: MAD 2104 and COT4420, or permission of instructor	
3. Course logistics	
Term: Fall 2017 Location: TBD	
4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Feng-Hao Liu, PhD Bldg. EE 96/ Room 529 TBD 561-297-2341 fenghao.liu@fau.edu
5. TA contact information	
TA's name *Office address* *Office Hours* *Contact telephone number* *Email address*	TBD
6. Course description	

This course covers major topics in the theory of computation and their philosophical meanings. Specific topics include hardness/randomness in computation and applications to cryptography and game theory.

Philosophy of Computation aims to understand the foundation of computation, which is linked to the question: "*What are the fundamental capabilities and limitations of computers?*" Particularly, we will study whether there is a task which is inherently hard for your computer, no matter how smart the algorithm designers are. If such a hard problem exists, what can we do with it? Can we utilize the limitation to achieve other important computational tasks? Interestingly the answer is yes -- we will demonstrate with several examples how to relate hardness to information security, and to more randomness efficient algorithm designs.

To address these studies, we need to formalize how we measure hardness for computers. We will consider different angles of resources such as time, space, randomness, and interaction, which define different models of computation. Studying these models is not only of theoretical interests, but also gives deeper insights to algorithm designs that inspire developments in many other fields, such as cryptography, security and privacy, game theory, communication, machine learning, and others. We will explore several great ideas that significantly advanced our understanding of computer science.

Department of Computer & Electrical Engineering and Computer Science
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Course Syllabus

7. Course objectives/student learning outcomes/program outcomes	
Course objectives	To learn the power and limitations of computers, and how to utilize them in different scenarios.

8. Course evaluation method	
4 Homework assignments (20% each): 80% Project: 20%	For the project, students must first identify a related topic, either from the textbook or research papers, and get approved by the instructor. Then the students will present the essential/novel ideas and technical contributions. Students will submit a final report for the project.

9. Course grading scale

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."

10. Policy on makeup tests, late work, and incompletes

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.

11. Special course requirements

NA

12. Classroom etiquette policy

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.

13. Disability policy statement

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.

14. Honor code policy

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 www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf

15. Required texts/reading

Computational Complexity: A Modern Approach.
By S. Arora and B. Barak. Cambridge University Press 2009, ISBN 978-0-521-42426-4

16. Supplementary/recommended readings

NA

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

Weekly Schedule	Topics
Week 01	The Computational Model, efficiency measure, limitation of computation
Week 02	The class P and NP and their philosophical meaning, reduction, and NP completeness
Week 03	Continue on NP/NP Completeness HW1
Week 04	Diagonalization
Week 05	Space Complexity
Week 06	Circuits and Parallel Computation HW2
Week 07	Randomized Computation I
Week 08	Randomized Computation II Project Topic Selection
Week 09	Interactive Proofs I HW3
Week 10	Interactive Proofs II

Week 11	Cryptographic Applications I
Week 12	Cryptographic Applications II HW4
Week 13	Probabilistic Checkable Proofs and Approximation Algorithms I
Week 14	Probabilistic Checkable Proofs and Approximation Algorithms II
Week 15	Quantum Computation Project Report Submission