4810-1183: Approximation and Online Algorithms with Applications: Syllabus

Class Information

Date/Time: Every Tuesday 14:55 – 15:40

Place: Room 214, Sci. 7 Building, Hongo Campus

About Instructor

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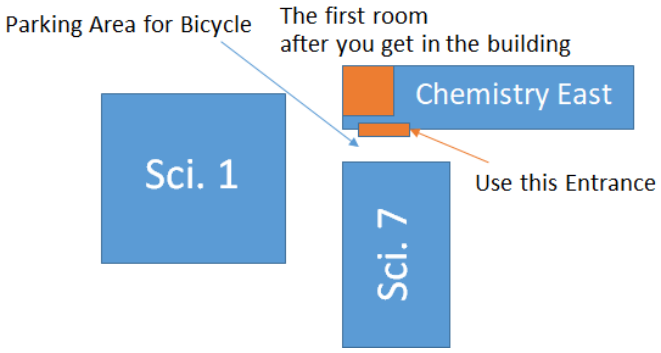
Office Hour: Every Monday 13:00 – 14:30 (appointment will be appreciated)



Class Evaluation

30% for midterm on June 5th, 70% for final examination on July 17th

Exam problem on last year can be found at the following link. There will be 3 problems for midterm and 3 problems for final exams. I expect that 70-80% of students will obtain the credits will get A. On last year, a student who can solve 1 midterm and 1 final problems "perfectly" can obtain A.
http://vorapong-sup.net/AO2017.html

Participation in the final exam is mandatory for the credits. Please contact me before April 24th if you cannot join the final exam on July 17th.

Textbook

I personally believe that the handout distributed in each class would be enough for this course. However, if you want to study each topic in more detail, my recommendations are as follows:

1) David P. Williamson and David B. Shmoys. The Design of Approximation Algorithms. Cambridge University Press, 2010.

2) A. Fiat and G. J. Woeginer (editors). Online Algorithms: The State of the Art. Springer, 1998.

Class Schedule

4/10	Lecture 1: Course overview, optimization models, linear programming
4/17	Lecture 2: NP-Hardness
4/24	Lecture 3: Approximation Algorithm I
5/1	No Class
5/8	Lecture 4: Approximation Algorithm II
5/15	Lecture 5: Approximation Algorithm III
5/22	Lecture 6: Approximation Algorithm IV
5/29	No Class (Graduate School of IST will implement Friday's courses on this day)
6/5	**Midterm Examination**
6/12	Guest Lecture (TBD)
6/19	Lecture 7: Inapproximability
6/25	Lecture 8: Online Algorithm I
7/3	Lecture 9: Online Algorithm II
7/10	Lecture 10: Online Algorithm III
7/17	**Final Examination**

Relationship with Other Courses

There is a course "Advanced Algorithmics" offered by Prof. Hiroshi Imai opened in this semester. The course will focus on randomized algorithms, which is another algorithmic paradigm beside approximation and online algorithms. I strongly believe that 2 courses are great complementary to each other.

On autumn semester, I will offer 2 courses, "Algorithms for Information Security and Privacy" and "Network Optimizations". Both of the courses will focus on more advanced algorithmic techniques for particular applications, namely for cryptography and for networks. If you feel that this course is too easy, you are encouraged to join again on next semester. Also, if you like this course, I hope to meet you again. About 20% of the course "Algorithms for Information Security and Privacy" might be overlapped with "Introduction to Cryptography" offered by Prof. Phong Nguyen this semester, but the courses are totally independent.

For those who have already taken those 2 courses, there is only about 20% overlap between this course and those two. As the teaching methods will be also different, I strongly believe that you can still learn something from this course.