Instructor: Adrian Dumitrescu, EMS 1081, 229-4265, Email: dumitres@uwm.edu

Office Hours: (may change) Tue & Thu 12:45–1:45pm or by appointment.

Midterm Exam: Thursday, March 16, 4:00-5:15pm.

University policies and other information: http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf

Prerequisites: Graduate student; CS 704 and/or consent of instructor.


Objectives: To study basic and advanced ideas in the design and analysis of approximation algorithms.

Outline: Tentatively lectures will cover the following topics. Some topics may be skipped or assigned for self-study, and additional material may be introduced. Some mathematical tools not covered in the lecture may be needed to fully understand the course material. The students are expected to study appropriate sections of the textbook and/or consult additional material based on what is needed.

1. Lower bounding OPT [Ch. 1]
2. Set cover [Ch. 2]
3. Steiner tree and TSP [Ch. 3]
4. Shortest superstring [Ch. 7]
5. Knapsack [Ch. 8]
6. Bin packing [Ch. 9]
7. Minimum makespan scheduling [Ch. 10]
8. Euclidean TSP [Ch. 11]
9. LP-duality [Ch. 12]
10. Set cover using rounding [Ch. 14]
11. Counting problems [Ch. 28]
12. Graph coloring
13. Geometric problems

Grading scheme: Midterm exam 20%, Final exam or joint research topic 30%, Topic presentation 25%, In class participation (includes in class answers and problem discussion at the board) 15%, Overall behavior and discipline 10%.

The exams are closed books and notes. No electronic devices are permitted. Makeup exams will not be given.

Remarks: 1. Being disciplined and having an active class participation is part of your grade. This means being active in class without disrupting the class and having a positive learning attitude. Finding errors and/or inaccuracies in the lecture notes or textbook or on the board is encouraged.

2. The following rules of good behavior and discipline need to be respected: You need to show respect to the instructor and your colleagues. If you send email to the instructor you need to address it properly. Occupy your seat before the start time of the class, and avoid leaving or entering during lecture time; you are asked to not bring food or drinks to class. You are expected to follow the lecture and participate in the discussion, and not be preoccupied with other activities; you need to bring the textbook with you every class. When you are sick, avoid coming to class; if you still need to come (in an exceptional situation), you need to sit as isolated as possible in the back row and avoid contact with others (to minimize the chance of transmitting your illness to others).

3. Electronic devices, including laptops, tablets, phones, etc., are prohibited during lectures and exams. Any such device should be turned off and put away (out of sight) in your bag. Breaking this rule during an exam carries a stiff penalty: a student
found in possession of an electronic device during an exam should be considered to be engaged in academic misconduct and should expect to receive a grade of zero on the exam. Before any exam you need to stow away your bag in a separate area of the exam room; you can only retrieve your bag after handing in your exam before leaving the room.

4. Attendance is not part of your grade. However, if you missed a class, you should borrow the notes for that class from another colleague. You are strongly advised to take written notes throughout the course, since not all topics may be covered in the textbook or the coverage/approach might differ from that in class. In addition, this will prepare you better for the written exams.

5. Homework assignments will be given and discussed in class; the solutions you prepare must be handwritten, not typed. You may be asked to present your solutions in class. While you can discuss solutions to homework assignments with others, the solution must be prepared independently by you; if you discussed assignments with others, you need to specify their names in your solutions. Similarly, if you use other materials/sources you need to clearly specify them in your solutions. Note that the midterm and final exams may use problems directly taken from homework assignments, so you are strongly advised to do the homework. It is unlikely that you will perform well in this course without a substantial effort to work on and understand the assignments.

6. You are expected to provide justifications and arguments to support your answers in all your assignments and exams, regardless if the problem asked for it or not. When you are asked to provide an algorithm, you must explain your algorithm and its general idea in words.

7. If you have to miss an exam or the deadline of an assignment because of an emergency, please contact the instructor at the earliest possible opportunity (use both e-mail and phone). If the instructor is not reachable, then try to contact the department secretary at 229-4677. No arrangements will be made for missed exams, unless these rules are followed and an acceptable evidence of legitimate emergency is submitted.

8. Plagiarism or cheating is taking someone else’s work and calling it your own. Plagiarism is not allowed and will be dealt with severely; it is a form of academic misconduct. In particular, copying from other sources (including the internet) without proper citation is disallowed. More information on academic misconduct is available at http://uwm.edu/academicaffairs/facultystaff/policies/academic-misconduct/

9. Your work will be graded not only on the correctness of the result, but also on the quality of presentation. An understandable handwriting is expected.