Semester: Spring Semester, 2018
Course Number: CISC 5835
Course Title: Algorithms For Big Data
Faculty: Dr. A. G. Werschulz
   Office: Rm 610D. Phone: (212) 636-6325
   E-mail: agw@dsm.fordham.edu
   WWW: http://www.dsm.fordham.edu/~agw/big-data-alg
   Office Hours: Mondays: 11:30 a.m.–12:30 p.m.
                  Mondays: 4:30 p.m.–5:20 p.m.
                  Thursdays: 11:30 p.m.–12:30 p.m.
                  (or by appointment)
Class Meetings: Mondays, 5:30pm–7:45pm, LL526.
Class Email List: big-data-alg@dsm.fordham.edu

Course Outline (Topical): This course covers some of the topics found in a traditional algorithms course, as well as algorithms suited to big-data applications. For the first, we will be covering the following chapters from Dasgupta:
   Prologue
   Divide-and-conquer algorithms
   Decomposition of graphs
   Paths in graphs
   Greedy algorithms
   Dynamic programming
   NP-complete problems

Turning to big-data-oriented algorithms, we will cover a selection of the following topics:
   Quantum computing (from Dasgupta)
   The map-reduce model
   Nearest-neighbor search
   Streaming
   Sketching
   Graph processing
   Metric embeddings
   Sublinear algorithms
   Randomized and probabilistic algorithms

Protocol: Examinations: The midterm examination will be on Monday, February 26, and will take up roughly one half of the regular class time period. The final exam will be on Monday, May 14, taking up the entire class time period.
Homeworks: Homework will be assigned on a regular basis; the assignments will be posted on the class website. Unless otherwise specified, they will be due at the beginning of the next class session. Homework assignments may involve theoretical work (such as determining the worst-case run-time of some algorithm)
or programming, perhaps both. Late homework will not be accepted, barring serious illness or unavailability of the Departmental computing facilities.

Late homework will not be accepted, barring serious illness or unavailability of the Departmental computing facilities.

Programming assignments will be graded as 60% on correctness, and 40% on style, the latter covering documentation, I/O, and overall program style. The class website has a link to my guide for getting better grades on programming assignments, which you should read if you want to do well under the “style” rubric.

**Electronica:** You may not use laptop computers, tablets, or mobile phones during class time.

**Grading:**

- homework assignments: 50%
- one midterm exam: 25%
- one final exam: 25%

**Other Requirements:** None.

**Readings:** We will be covering materia from sections from Chapters 0–6, 8, and 10 from the Dasgupta text, as well as additional material to be specified.

**Academic Integrity:** To begin with, you should familiarize yourself with the University’s policy on Academic Integrity, which may be found at [http://www.fordham.edu/info/25380/undergraduate_academic_integrity_policy](http://www.fordham.edu/info/25380/undergraduate_academic_integrity_policy)

Pay special attention to the Standards of Academic Integrity. As a corollary to same, you are not to pass off someone else’s solution to any homework exercise (including programming problems) as your own, regardless of whether you obtained it from a fellow student, an acquaintance, or from the Web. Analogously, you should take all reasonable necessary steps to prevent other people from stealing your work; in particular, when you write a program on the Departmental Linux systems at Lincoln Center, it should be located in (an appropriate subdirectory of) your private directory.

As likely as not, you will find yourself stumped by some phase of a homework problem. When this happens, you should check with me during office hours (or you should make an appointment if office hours are inconvenient). Anything that you turn in is to be your own work. If you are in doubt as to the legitimacy of your actions, ask me beforehand.

**Additional Remarks:**

There will be no make-up exams given after the exam date. If you know in advance that you will have to miss an exam, you must check with me (in advance) to avoid getting a zero for that exam. In case of illness on an exam date, please contact me as soon as possible, so that appropriate arrangements can be made.

As noted above, this course has a website, which you should visit for announcements, assignments, and links to useful resources.

If you believe that you have a disabling condition that may interfere with your ability to participate in the activities, coursework, or assessment of the object of this course, you may be entitled to accommodations. If so, please schedule an appointment to speak with me immediately or you may go to the Office of Disability Services (x6282). Under the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973, all students, with or without disabilities, are entitled to equal access to the programs and activities of Fordham University.