Spring 2-1-2017

M 462.01: Theoretical Theories of Big Data Analytics and Real Time Computation Algorithms

Leonid Kalachev
The University of Montana

Peter V. Golubtsov
University of Montana - Missoula, peter.golubtsov@umontana.edu

Math 462: Theoretical Big Data Analytics

Spring 2017

Course Instructor / Information: You may contact the instructor for help during his office hours:

Name	Office	Office Hours	Email
Peter Golubtsov	Math 309	M,W,F 3–4	peter.golubtsov@mso.umt.edu

Course Format: 3 lectures: M-W-F-- 10:00AM-10:50AM, MATH 306.

Website: All the information pertinent to this course will be posted on the course website. In particular, the list of homework assignments, current lecture topics information, etc., will be placed there together with video records of the lectures.

Prerequisites: Consent of instructor. Familiarity with Linear Algebra, Probability and Statistics and scientific programming (e.g., in MatLab or Python) will be helpful.

Course Goals: The main goal of this course is to provide students with a unique opportunity to acquire conceptual background and mathematical tools applicable to Big Data Analytics and Real Time Computation. The course will briefly review specific challenges of Big Data Analytics, such as problems of extracting, unifying, updating, and merging information and specific needs in processing data, which should be highly parallel and distributed. With these specific features in mind we will then study more closely a number of mathematical tools for Big Data analytics, such as regression analysis, linear estimation, calibration problems, real time processing of incoming (potentially infinite) data. We will see how these approaches can be transformed to conform to the Big Data demands. We will also discuss why most of widely used algorithmic languages are not quite appropriate for solving such problems and outline alternative approaches.

Grading Policies: Several homework assignments will be given during the semester (60% of final grade); there will be a **final exam** during the finals week (30% of final grade). Most of the material will only be given in class, so the attendance is very important for understanding of the course material. Thus, the course will also be based on attendance (10% of the final grade).

The grading scale is:

A: [85%, 100%]; B: [70%, 85%); C: [55%, 70%); D: [40%, 55%); F: [0%, 40%); CR: [40%, 100%].

Exceptions to the above rules regarding taking tests, etc., may be made by the course coordinator on an individual basis. *If you are taking this course as a general education requirement, you must take it for a traditional letter grade (not CR/NCR). A grade of "D-"is considered passing and will earn you credit for the course, BUT it will NOT fulfill your general education requirement and you will have to re-take the class.*

Add / Drop policies: The last day to add/drop a course, change sections, or change grading option (between letter grade, Credit / No Credit, Audit) is **April 3, 2017**. From **April 4** and until **May 5, 2017** these changes are allowed to be done only with the signature and approval by the professor. In case of drops only, the petition also requires signature of the Dean of the student's major. **The final deadline for all changes is May 5, 2017**.

Academic Misconduct: *All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. You can find it in the "A to Z Index" on the UM home page.*

Disability Services: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. We will work with you and DSS to provide an appropriate accommodation.