Course Number: 15-319
Course title: Introduction to Cloud Computing
Units: 6 units
Prerequisites: 15-213, 15-211, and 15-251
Available for: CS juniors and Seniors
Counts as: Computer Science Elective

Instructor: Majd F. Sakr
Room: 1007
Telephone: +974-454-8625
Email: msakr@qatar.cmu.edu
WWW page: http://www.qatar.cmu.edu/~msakr/15319-s10/

Course description:

Cloud computing is an emerging parallel computing paradigm that provides flexibility, elasticity, reliability, high utilization and pay-as-you-go-model while removing the overheard of maintaining a system-specific, fixed-sized cluster of under-utilized machines. This course aims to provide a systems overview and programming perspective of the cloud computing paradigm. Students will get exposed to the topic in general as well as some background material to help them learn the different enabling technologies of this new paradigm. Students will learn effective techniques to program cloud systems and develop an understanding of the current challenges and tradeoffs when mapping different application suites to a cloud. The course will also provide a foundation on data-intensive, compute-intensive and high performance computing. Topics covered include: Introduction to different emerging computing paradigms; background material on architecture, networking and operating systems for cloud computing; introductory topics in heterogeneous and distributed systems, and parallel processing; introduction to enabling cloud computing concepts, such as virtualization, distributed storage systems, and the MapReduce programming model; Hadoop, Apache's implementation of MapReduce; parallelization and implementation of different algorithm types using Hadoop; performance evaluation and trade-off analyses of different algorithms on the cloud.

Books/materials:

The primary textbook for this course is:

- Tom White, *Hadoop: The Definitive Guide*, O'Reilly Media, 2009.

Reference books/materials:

- Randal E. Bryant and David R. O'Hallaron, *Computer Systems: A Programmer's Perspective*, Prentice Hall, 2003.

- Patterson and Hennessy, *Computer Organization and Design: The Hardware/Software Interface, Fourth Edition*, Morgan Kaufmann/Elsvier.