Course Title	**Principles of Urban Informatics I**
Course number	**CUSP-GX-5003**
Time	**Section 1: Thursday. 9.30 AM - 11.00 PM (820)**
	Section 2: Thursday. 5:40 PM - 7:10 PM (820)
	Lab 1: Thursday. 11.00 AM - 12.20 PM (820)
	Lab 2: Thursday. 11.00 AM - 12.20 PM (816)
	Lab 3: Thursday. 7.10 PM - 8.30 PM (820)
Dates	**09/04/2014 - 12/11/2014**
Room	**Magnet, 2MTC, 8FL, Room 820 or 816 (as specified above)**
Credits	**3**

Teaching Team

Instructor: Claudio T. Silva
TA LAB 1: Cesar Palomo (office hours: Wednesday 9AM-11AM)
TA LAB 2: Fabio Miranda (office hours: Tuesday 2PM-4PM)
TA LAB 3: Nivan Ferreira (office hours: Thursday 2PM-4PM)
TA: Kunal Barde

(*Discipline Core*) (3 credits) – Introduction to the core disciplines of data acquisition and management, integration, and analytics; presents software tools, frameworks for problem-solving using data science in the urban context, including basic modeling and analytical methods; visualization techniques, including geographic information systems; working with large datasets and understanding data sources.

Learning objectives

In this course, the student will learn the major concepts, tools, and techniques for what informatics can do for cities. It includes background in data management, visualization, and data science, including how to best handle spatial-temporal data. The course is essentially divided into two major parts, each of which will have written and programming assignments. The first major part will present **data management techniques** while the second major part is focussed on **visualization of urban data**. Throughout the course we will try to improve

the students programming skills. Python will be our primary language, although other languages might be introduced as needed.

Major references

Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython
Wes McKinney
O'Reilly Media, 2012

Dive Into Python
http://www.diveintopython.net/

SQL in a Nutshell
Kevin Kline, Brand Hunt, Daniel Kline
O'Reilly, 2008

Visualization Analysis and Design: Abstractions, Principles, and Methods
Tamara Munzner
AK Peters, to appear, 2014.
http://www.cs.ubc.ca/~tmm/courses/533/book/vispmp-draft.pdf

Class Mechanics

Each student will be **required** to attend one lecture and one lab session each week as assigned. Our goal will be to post material covered in class (including slides and reading materials), by the day following the lectures and/or lab.

Lectures will be approximately 90 minute long.

Labs will typically have a shorter 10-30 minute presentation by the TA followed by hands work by the students. Students are advised to take a computer to class.

Assignments

There will be weekly assignments. They will be handed out on Mondays COB, and are due the following week. Students should expect their grades every week.

Assignments will not be accepted late. Students will be given a one-time two-day exemption for an unexpected event.

Plagiarism will be dealt with very strictly, please see, e.g., NYU Engineering policy on academic dishonesty: http://engineering.nyu.edu/academics/code-of-conduct/academic-dishonesty

Grading

Your grade will be based on the following combination:

Attendance & Participation: 15%
Midterm: 15%
Final: 20%
Assignments: 50% (roughly one a week, that is, expect 10 assignments)

Tentative Schedule - Fall 2014

(All lectures by Claudio unless specified)

1) September 4th
   Lecture: welcome to Urban Inf
   Lab: NO LAB

2) September 11th
   (Claudio in Chicago)
   Lecture: Introduction to databases
   Lecturer(s): Nivan & Fabio
   Lab: Introduction to python data structures
        Dictionaries and lists; reading csv files; computing basic statistics

3) September 18th
   Lecture: The relational model
   Lab: Tutorial on pandas and python programming exercises

4) September 25th
   Lecture: Relational Algebra
   Lab: Practical example of database modeling and installation of MySQL

5) October 2nd
   Lecture: SQL
   Lab: Loading data into databases and basic SQL querying in MySQL shell

6) October 9th
   Lecture: More on SQL
   Lab: Python and SQL integration

7) October 16th
   Lecture: Elementary Plotting Techniques I
   Lab: Introduction to matplotlib

8) October 23rd
   (Claudio in Sweden)
   Lecture: **Midterm** (on material including up to Oct 9th)
   Lab: NO LAB; lab time will be used to allow for two full hours for the midterm

9) October 30th
   Lecture: Elementary Plotting Techniques II
   Lab: pandas + matplotlib

10) November 6th
   Lecture: Human Vision & Color
   Lab: pandas + matplotlib

11) November 13th
   (Claudio in Paris)
   Lecture: **Guest Lecture** (TBD)
   Lab: Mapping geo-referenced data

12) November 20th
   (Claudio in Shanghai)
   Lecture: Spatial Temporal Urban Data I
   Lab: Mapping geo-referenced data

13) November 27th (Thanksgiving)
   Lecture: NO CLASS
   Lab: NO LAB

14) December 4th
   Lecture: Info Vis I
   Lab: Introduction to massive data handling

15) December 11th
    Lecture: Info Vis II
    Lab: Review for final

16) December 15th-19th
    Final (Date TBD)