Carleton University, Ottawa, Canada
School of Computer Science
Course Outline 2015 (Fall)

Course number and title:

COMP 5209 (0.5 credit): Visual Analytics

Instructor:

Robert Biddle
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Office Location: HP 5169
Office Phone: 520-2600 extension 6317
Office Hours: By arrangement, or informally afternoons in HCI2110
Primary method of contact: Email.

Meetings:

Term: Fall, 2015
Times: 2:35–5:25 PM Friday September 4, then Mondays September 14 – December 7 (But not in Fall Break, October 26)
Room: Canal Building CB2400

Online Resources:

All course papers and other resources will be available online at:

`http://hotsoft.carleton.ca/comp5209/`

Access is restricted: please contact the instructor for authorization. There will also be a class mailing list for announcements and discussion:

`comp5209@hotsoft.carleton.ca`

Course Objective:

This course is intended to give the student a good understanding of visual analytics and information visualization. In particular, it will especially address the principles from perception and cognition that can be used to ground human-computer interaction (HCI) design.

Information visualization has been a widely acknowledged area of study since the late 1980s: a special issue of the journal *Scientific Computing* , on "Computer Graphics on Visualization", is sometimes identified as the birth of the area. The idea was to generalize the earlier-established

field of "Scientific Visualization" to a broader domain, and to leverage advances in computer graphics. Earlier work such as Jacques Bertin's 1967 "Semiology of Graphics", with a strong geographic focus, were seen as pre-cursers of the new field. Today there are a wide range of conferences and journals.

Visual analytics is a description articulated in the 2005 book *Illuminating the Path* (Thomas and Cook, Eds.) to emphasize the positive effect on analytical reasoning that can be supported by interactive visual interfaces.

Instructor's Statement:

Principles, techniques, technology and applications of information visualization for data analysis. Topics include human visual perception, cognitive processes, static and dynamic models of image semantics, interaction paradigms, big data visual analysis case studies.

Topics:

Main topics will include major areas such as: Topics include human perception and cognitive processes, visual formalisms, the focus+context problem and solutions, multi-dimensional techniques, application systems, and evaluation.

Assessment:

Assessment will be based on presentation and discussion of papers from the literature, and a major project, including a formal proposal, a presentation, and a final paper documenting the project.

Paper presentation and discussion: 20%
Project Proposal: 20%
Project Presentation: 15%
Final Project Paper: 45%

Paper presentation and discussion marks will be based on student presentations and discussion of assigned readings from the literature. Students are expected to read all papers, take turns leading discussions, and contribute comments as appropriate.

The project proposal will be due mid-semester, and require a short paper including: a project goal with motivation, reviewing the relevant literature from the course, and a detailed plan. The project presentation will be due near the end of the course, and will require a presentation to the class outlining the project and showing progress. The final paper will be due after the conclusion of all meetings, and will require a full formal paper, documenting all aspects of the project, including goal and motivation, related literature, a description of the work in the project, and the results.

Projects, including proposal, presentation, and final paper, should preferably be done by a team of two people, but may be done individually if approved. Team projects must include statements about individual contributions.

There will be no formal examination for this course.

Textbook and Other Reading:

The textbook for the course is by Colin Ware: *Information Visualization, Perception for Design* in its 3rd edition, published 2013. This is available at booksellers such as `amazon.ca`, and also available free as an e-book through both the Carleton and University of Ottawa libraries. The book takes a bottom-up approach, beginning at immediate perception in human visual biology, and then moving to high cognitive levels, and at each step discussing the implications for information visualization design.

In addition to the chapters in the textbook, we will use a variety of key papers from the literature on Visual Analytics and Information Visualization, principally from papers available through the ACM and IEEE Digital Libraries available through the Carleton and University of Ottawa libraries. A full list of the papers is available on the course website.

University Policies

Student Academic Integrity Policy: Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar.

Plagiarism: As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science.

Unauthorized Co-operation or Collaboration: Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

Students with Disabilities Requiring Academic Accommodations: Register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the

PMC, 613-520-6608, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by the deadlines published on the PMC website: `https://www.carleton.ca/pmc/students/dates-and-deadlines/`

Religious or Other Obligation: Write to me concerning any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website `http://www.carleton.ca/equity/accommodation`

Medical Certificate: The following is a link to the official medical certificate accepted by Carleton University for the deferral of final examinations or assignments in undergraduate courses. To access the form, please go to `http://www.carleton.ca/registrar/forms`