École des sciences de l'information
School of Information Studies

ISI 6300A Information Visualization

Fall 2019, Tuesdays 14:30-17:30, Desmarais

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Office hours:	**Thursday 16:00-17:00 or by appointment**

Course description

ISI6300A Information Visualization (3cr.)

This course builds upon the on the *ACRL Visual Literacy Competency Standards for Higher Education* and teaches students how visual information is perceived and can be used most effectively. Students learn how to differentiate between various data and attribute types of visual information, use basic functions of various data visualization tools. Upon completion of this course students will be familiar with methods of data collection and will be familiar with various data sources, interpret and create maps, flow charts and network graphs and able to read, interpret and design infographic and visual stories as well as develop and present information visualizations.

Course objectives and learning outcomes

Upon completion of this course, students will be able to:

- Know and understand the importance of virtual literacy,
- Understand how visual information is perceived and can be used most effectively,
- Differentiate between various data and attribute types,
- Use basic functions of various data visualization tools,
- Be familiar with data sources and methods of data collection,
- Interpret and create maps, flow charts and network graphs,
- Read, interpret and design infographics and create visual stories,
- Develop, design and present information visualizations.

Language of instruction

English

Students may submit their work in either English or French in accordance with the University of Ottawa's Regulation on Bilingualism: http://web5.uottawa.ca/admingov/bilingualism.html

Teaching methods

The course will include presentations by the professor, class discussions and exercises, readings, assignments, group work and a final paper.

Communication

Students are encouraged to use the course Slack (invitation via email) to engage in online discussions and share information relevant to the course with each other. The preferred mode of communication with the professor is in person during office hours, before and after class or during individual appointments arranged via Slack or email. Alternatively, the professor can be contacted via Slack or email.

Evaluation methods and distribution of grades

Assignments	40%	Deadlines for assignments and the final paper must be
Group presentation	30%	respected.
Final visualization and report	30%	
	100%	

Recommended readings

Students are encouraged to read recommended readings. However, the course focuses mostly on practical application of information and data visualization. Students are required to obtain and familiarize themselves with required software packages. Video tutorials providing basic introductions can be found on Lynda.com (access via uO Library) and Youtube. Links are provided in BrightSpace.

Albers, J. (1963). Interaction of Color – 50th Anniversary Edition. New Haven, NJ: Yale University Press.

Börner, K., & Polley, D.E. (2014). *Visual Insights. A Practical Guide to Making Sense of Data*. Cambridge, MA: MIT Press.

Cairo, A. (2016). *The Truthful Art. Data, Charts, and Maps for Communication*. New Riders.

Munzner, T. (2014). *Visualization Analysis and Design*. Boca Raton, FL: CRC Press.

Rendgen, S. (2012). *Information Graphics*. Cologne: Taschen.

Tufte, E. (1983). *The Visual Display of Quantitative Information* (2nd ed.). Cheshire, CT: Graphics Press.

Tufte, E. (2006). *Beautiful Evidence*. Cheshire, CT: Graphics Press.

Scott, J. (1991). *Social Network Analysis* (4th ed.). Sage Publications: London.

Academic Regulations

Please consult the University of Ottawa's regulations on:

- **Academic Fraud**: http://www.uottawa.ca/about/academic-regulation-14-other-important-information
- **Plagiarism:** http://www.uottawa.ca/vice-president-academic/sites/www.uottawa.ca.vice-president-academic/files/academic-integrity-students-guide.pdf
- **Examinations & Grading**: http://www.uottawa.ca/graduate-studies/students/general-regulations?cat_1=89

Sexual Violence

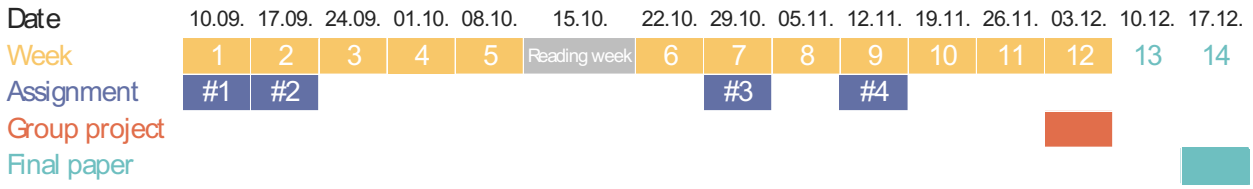
The University of Ottawa does not tolerate any form of sexual violence. Sexual violence refers to any act of a sexual nature committed without consent, such as rape, sexual harassment or online harassment. The University, as well as student and employee associations, offers a full range of resources and services allowing members of our community to receive information and confidential assistance and providing for a procedure to report an incident or make a complaint. For more information, visit uottawa.ca/sexual-violence-support-and-prevention.

Mental Health

The University of Ottawa and your professors are committed to your wellbeing. The University's core values include preparing students to become leaders and encouraging and enabling them to achieve personal growth and wellness. As such, the *Mental Health and Wellness* website acts as a central location for information and resources at our University and in the surrounding community. It is also an excellent tool for family members, friends and colleagues who may need to help someone close to them that is studying or working at the University. For more information, visit uottawa.ca/wellness/.

For 24/7 support, students can call *Good2Talk* at +1 (866) 925-5454. *Good2Talk* is a post-secondary student helpline which provides professional and confidential support for students in Ontario free of charge.

Calendar of activities and evaluations



Class presentations and discussions

Each week focuses on a specific topic related to Knowledge Organization (KO) and includes lectures, class and group discussions, practical exercises and assignments.

Week 1. Perception of visual information *(10.09.)*

Course overview and requirements; Perception and effectiveness of visual information

Assignment 1: Short presentation of a data visualization or tool of your choice (due dates t.b.d.)

Week 2. Data types and attributes and data visualization workflows *(17.09.)*

Types and modes of visualizations; data visualization workflows

Assignment 2: Dataset (due 22.09.)

Week 3. Principles of data visualization *(24.09.)*

Color theory; Design principles

Week 4. Data visualization tools and data collection *(01.10.)*

Tools for data visualization; Data sources

Week 5. Data vis project I *(08.10.)*

Identifying topic and data of data vis project

Week 6. Marks and channels *(22.10.)*

Point, line, area and volume marks; Magnitude and identity channels; Channel effectiveness; Glyphs

Week 7. Numerical and categorical data and respective data visualization idioms *(29.10.)*

Numerical data; Categorical data; Choosing a suitable data vis idiom; Effectiveness of chart types

Assignment 3: Idiom selection (due 03.11.)

Week 8. Maps *(05.11.)*

Guest speaker: René Duplain (uOttawa, Morisset Library)

Cartography and mapping; Maps with statistical material

Week 9. Networks and flowcharts *(12.11.)*

Guest speaker: Felicity Tayler (uOttawa, Morisset Library)

Social network analysis; Flowcharts

 **Assignment 4**: Social network graph (due 17.11.)

Week 10. Infographics and storytelling *(19.11.)*

Guest speakers: Alli Torban (DataVizToday Podcast)
Gisèle Richard (uOttawa, Teaching and Learning Services)

Infographics; Storytelling; Layout and composition; Images

Week 11. Data vis project II *(26.11.)*

Finalizing data collection and visualization

Week 12. Data vis project III: Presentation *(03.12.)*

Group presentations and evaluation of data visualization

 **Presentation**: Data vis project

Assignments

With the exception of *Assignment 1*, assignments need to be submitted individually via BrightSpace and are due at 8 PM each Sunday after they were assigned. Late submissions will be penalized by 5% per day, exceptions must be discussed with the professor before the due date. *Assignment 1* is a group work where two students prepare a short presentation about a data visualization tool or data visualization of their choice presented during one of the classes (dates t.b.d.).

Assignment 1: Short presentation (due dates t.b.d., between 17.09. and 26.11.)
Assignment 2: Dataset (due 22.09.)
Assignment 3: Idiom selection (due 03.11.)
Assignment 4: Social network graph (due 17.11.)

Final exam

The final exam consists of data visualization group project and a final visualization and report. For the group projects students develop and design, in groups of 3-4, a visualization, which demonstrates a variety of data visualization idioms and the use of data visualization tools demonstrated and applied in class. The visualization can be based on any topic and dataset. Data can be reused and/or collected specifically for the project.

Group presentation

During the semester students develop, in groups of 3 to 4, a data visualization project. The project can focus on any topic and research question and use existing or collect original data. Students have time to work on the project in class during week 5 and week 11 and on their own time.

Visualization draft

When presenting their group project in week 12, students are expected to deliver a draft version of the final visualization. The visualization can take any of the following formats:

- → Infographic
- → Webpage (with interactive elements)
- → Video (animated visualization)
- → Other format (needs to be discussed in advance with the professor)

Presentation

Results are demonstrated in 20-minute presentations in class in week 12.

Group presentation (due 03.12., in class)

In addition to the visualization draft, students are expected to provide a step-by-step walk-through of the data visualization (using presentation slides) incorporating elements of storytelling with a focus on the research question. The presentation will be graded based on the following elements:

- → Data collection methods
- → Data visualization tools used
- → Variety of data visualization idioms applied
- → Effectiveness of graphs and charts
- → Communication skills
- → Team work

Final visualization and report

The final visualization and report are based on and describe the group project developed during the semester and presented in week 12. The final visualization and report can be submitted as a group work, where each group member contributes approx. 800 words, or individually (1,000 words). The report needs to be written double-spaced text with references formatted in APA citation style. Students are expected to cite a minimum of three sources to support idiom selection and data collection. The document needs to be submitted in PDF.

Final visualization and report (due 17.12., via BrightSpace)

Visualization

The final visualization is based on the draft version presented week 12 and incorporates the feedback provided in class. The visualization can take any of the following formats:

- → Infographic
- → Webpage (with interactive elements)
- → Video (animated visualization)
- → Other format (needs to be discussed in advance with the professor)

It will be graded based on the following elements:

- → Variety of data visualization idioms applied
- → Effectiveness of graphs and charts
- → Design principles, alignment and color theory
- → Quality of image resolution
- → Storytelling and research question

Report

The report accompanies the visualization and describes the method of data collection, analysis and visualization including the selection of idioms and application of design principles. The report should contain the following elements:

- → Introduction
  Describe the topic and data in context: Why is it interesting? What is the goal of your project? What is the objective and research question?
- → Methods
  How did you collect and visualize the data? How did you choose the data vis idioms? Which marks and channels were used to visualize data and why?
- → Results
  What does your visualization show? What is emphasized?
- → References

The report will be graded based on the following elements:

- → Clarity, brevity, spelling and punctuation
- → Methods and data collection