



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
COURSE OUTLINE

1. **Course:** CPSC 683: Information Visualization: Theory and Practice

Lecture Sections:

L01, W 11:00-13:45, MS 680A, Sheelagh Carpendale, MS 680J, 220-6055, sheelagh@ucalgary.ca
Office Hours: By Appointment

Course Website: <http://innovis.cpsc.ucalgary.ca/Courses/CPSC683-2016>

Computer Science Department Office, ICT 602, 220-6015, cpsc@cpsc.ucalgary.ca

2. **Prerequisites:** Consent of the Department

(<http://www.ucalgary.ca/pubs/calendar/current/computer-science.html#3620>)

3. **Grading:** The University policy on grading and related matters is described in sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Project	65%
Paper Presentation	15%
Class Participation and Assignments	20%

This course **will not** have a Registrar's Scheduled Final Exam.

Special Regulations affecting the Final Grade: None.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar. Section 3.6. It is the student's responsibility to familiarize themselves with these regulations. See also Section E.6 of the University calendar.
 5. **Scheduled Out-of-Class Activities:** REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME ACTIVITY. If you have a clash with this out-of-class activity, please inform your instructor as soon as possible so that alternative assignments can be arranged.
 6. **Course Materials:**
Visualization Analysis and Design, Tamara Munzner, *AK Peters* (Recommended)
Other recommended texts are listed on the course webpage.
- Online Course Components:**
See course webpage.
7. **Examination Policy:** None. Students should also read the Calendar, Section G, on examinations.
 8. **Approved Mandatory and Optional Course Supplemental Fees:** None.
 9. **Writing across the Curriculum Statement:** In this course, the quality of the student's writing in the weighted components of the course will be a factor in the evaluation of these components. See also Section E.2 of the University Calendar.
 10. **Human Studies Statement:** Students will be expected to participate as subjects or participants in projects. See also Section E.5 of the University Calendar.

11. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offense that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K, Student Misconduct to inform yourself of definitions, processes and penalties.
- b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points which can be found in each classroom and building.
- c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Computer Science.
- d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>
- f) **Student Union Information:** VP Academic (403) 220-3911 suvpaca@ucalgary.ca SU Faculty Rep (403) 220-3913 science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca, Student Ombuds Office: (403) 220-6420 ombuds@ucalgary.ca, <http://ucalgary.ca/provost/students/ombuds>
- g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend your cell phone should be turned off unless instructed otherwise. All communications with other individuals via laptop computers, cell phones or other devices connectable to the internet in not allowed during class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- h) **U.S.R.I.:** At the University of Calgary feedback provided by students through the Universal Student ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference – please participate in USRI surveys.

Department Approval _____ Date _____

Associate Dean's Approval for out of regular class-time activity: _____ Date: _____

Associate Dean's Approval for Alternate final examination arrangements: _____ Date: _____

A signed copy of this document is kept on file in the Computer Science main Office ICT 602

CPSC 683 Percentage to Letter Grade Conversion Table

A+	95-100
A	90-94
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	65-69
C	60-64
C-	55-59
D+	50-54
D	40-49
F	0-39

CPSC 683 Syllabus

Tentative Topics Covered

The goal of Information Visualization (InfoVis) is to make use of efficient visual representations that help people to understand data, and to provide interaction capabilities that are designed to efficiently analyze these representations. The field of InfoVis creates meaningful interactive visualizations in order to help people navigate and analyze – potentially large quantity of – abstract data; in order to gain insights; and ultimately make decisions based on these insights, for many types of datasets, tasks, and analysis scenarios.

The goal of this course is to introduce students to the research field of Interactive Information Visualization. The course presents both seminal and recent work in InfoVis by looking at a variety of topics from the research field. It will cover a subset of the topics listed below. Each of these topics contains a fundamental approach to creating information visualizations. Each has its own guiding principles, its own significant publications, and its own research methods. While we will discuss each separately keep in mind that in reality some chosen subset of these is usually used in conjunction.

- Representation of data (or data mapping to visual symbols/structures) (Bertin's book).
- Principles of design thinking, notably Sketching: the basic idea is that rough quick sketches help with rapid ideation (Sketching User Experience: the workbook).
- Principles from perception - Visualizations are made to be seen. Knowing the details of how we see, can help us make the correct choice of how to represent data in a visualization (Ware's book).
- Principles from cognition, notably externalization - By visually representing our data we are creating an externalization of it. Externalization has been shown to help in some of our efforts to understand, such as by taking notes we externalize some of our memory function.
- Principles from graphic design - the basic idea is that there are good designs and bad designs and that by examining the good and the bad designs carefully one can extract guidelines (Tufte's books).
- The type of data to be analyzed (e.g., tabular data, hierarchical data, graphs and networks).
- Principles of task-based design - the basic idea is that the visualization should be practical, that people should be able to use it to work with their data.
- Constructive Visualization - the basic idea is that breaking visualizations in their component parts and making it possible to de-construct and construct visualizations helps makes visualizations and the data they represent more comprehensible.
- Applications (e.g., web, text, biology, social data).
- Interaction (e.g., navigation, transformations, details on demand)
- Communication, storytelling, visualization literacy.
- Evaluation methodologies and issues.