

Welcome to the

**University of Saskatchewan - Department of Computer Science**

# CMPT 480/840 Accessible Computing

## Web site for 2016

This course will investigate the analysis and design of accessibility issues and features related to computing applications. While the focus is on computing accessibility, this course also provides a comprehensive background to accessibility that can also be applied within other domains.

This course material has been significantly revised to make use of information in the new ISO/IEC Guide 71:2014 on Accessibility, especially the 11 accessibility goals (principles) that it discusses.

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[Class News](#): Welcome [Updated July 14]

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## Computer Accessibility is EXTREME HCI!

Human-Computer Interaction is about designing usable systems. Accessibility is about designing usable systems for the widest possible diversity of people and contexts of use.

- ISO 9241-171 Guidance on Software Accessibility defines accessibility as,
  - "usability of a product, service, environment or facility by people with the widest range of capabilities "
- and it notes that:
  - "The concept of accessibility addresses the full range of user capabilities and is not limited to users who are formally recognized as having a disability."

Thus, **good accessibility serves all of us.**

Accessibility is the new frontier of developing usable systems. CMPT 480/840 Accessible Computing is in the forefront of this movement. ASSETS, the ACM conference that focuses on accessibility, published a paper, [Techniques to Assist in Developing Accessibility Engineers](#), about our course in 2008, before any other accessible computing courses had appeared in North America.

Accessibility involves the ultimate in multi-media {visual, auditory, tactile} and media-shifting to communicate using media that the user is capable of using. Therefore, accessibility involves finding new and alternate ways of interacting with different users within a single application. This leads us to consider new ways of using existing technologies and new technologies for existing problems.

Please contact [Prof. Jim Carter <carter@cs.usask.ca>](mailto:carter@cs.usask.ca) for further information.

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## Learning Objectives

A student successfully completing this course shall be able:

1. To identify opportunities for improving the accessibility of existing and proposed systems
  2. To apply and combine various approaches to developing accessible systems
  3. To understand the needs of persons with disabilities and to be able to recognize and make use of their abilities
  4. To understand and apply the concepts of user preferences, individualization, and assistive technologies
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## Instructor:

[Jim Carter <carter@cs.usask.ca>](mailto:carter@cs.usask.ca) 280.3 Thorvaldson Bldg, 966-4893.

Office hours: Mon/Weds/Fri 12:30 - 1:20 or by appointment.

## Text / Recommended Reading:

The main text is a manuscript of the book: *A Principled Approach to Accessibility* by Dr. Jim Carter.

Class notes are also provided that summarize key points in most of the chapters. Students may wish to download the class notes prior to the class to use as a basis for their personal note taking, however minor changes to the notes may be made by the instructor right up to class time. Lecture material will go beyond these notes and students are warned that reading the notes is not a substitute for attending and participating in class.

Free access to all chapters of the text will be provided to students registered in the class via the [Moodle system](#).

The text and notes are copyright by Dr. Jim Carter and freely provided for the use of registered students in the class and shall not be shared or published outside the class.

## Lecture/Discussions:

**The class will meet every M/W/F afternoon from 1:30 to 2:20 in Thorvaldson Spinks 371.**

- Students are expected to attend all class sessions and are requested to inform the instructor via e-mail if they will be unable to attend any particular session.
- The role of the lecture sessions is to present important material to the students and to engage all class participants in a discussion of this material.
- Questions and discussions are highly encouraged. Students are responsible for all material covered in the class lecture sessions.

## Assignments/Project:

NOTE: **There are no exams.** The expectations of your class work take this into account. This means that the critiques and project play a very significant role in your grade.

**Assignments:** A number of interactive assignments will be used to acquaint students with a range of accessibility issues and a range of techniques for dealing with these issues. It is expected that the weekly

assignments will take approximately 1 1/2 hr each.

**Critiques:** Students will be expected to become familiar with the assigned readings prior to the class in which they will be discussed. Students will be assigned to prepare critiques of particular readings. It is expected that weekly critiques will take approximately 3-5 hrs each.

**Project:** A major project will require students to investigate a related topic in greater detail than is covered in the class. Students will be required to make a short accessible presentation about their project. The project is divided into phases to provide students with feedback on their progress.

## Marking:

20% [Assignments](#)

30% [Critiques of Assigned Readings](#)

50% [Term Project](#)

5% [Project Proposal](#) [due: Oct 3, noon]

15% [Project Analysis and Design Report](#) [due Oct 31, noon]

15% [Project Evaluation Report](#) [due Nov 28, noon]

5% [Project Presentation](#) [Dec 5 during class time]

10% Revised Project [due Dec 8, 5 pm]

Please NOTE: There is no final exam in this course. The critiques which are a major part of the class provide better evidence of the student's overall understanding than an examination could.

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## Course Outline

[All dates and topics subject to change]

### Basic Concepts

#### 1. Introduction [Sept 7-9, 2016]

1. Course overview
2. Accessibility involves each of us
  - Identifying Our Own Needs
  - Who needs accessibility?
3. Defining Accessibility and Usability
  - access
  - accessibility
  - usability
4. Approaches to Accessibility
  - medical models of disability
  - social models of disability
  - universal accessibility
5. ISO/IEC Guide 71
  - accessibility principles/goals
  - user characteristics
  - design strategies

*Critique 1: Ch 3 Widest Range of Users due noon Monday Sept 12*

*Assignment 1: [Before and After Considering Accessibility](#) due noon Tues Sept 13*

## User focused Principles

### 3. Widest Range of Users [Sept 12-16, 2016]

1. User Characteristics and Abilities
  - diverse users
  - diverse vs. entitled users
2. Diverse Contexts of Use
  - traditional IT contexts
  - mobile contexts
  - Internet of Things contexts
3. Related User Accessibility Needs and Solutions

*Critique 2: Ch 4 User Expectations due noon Friday Sept 16*

*Assignment 2: [Automatic Accessibility Evaluations](#) due 12 noon Tues Sept 20*

### 4. User Expectations [Sept 19-23, 2016]

1. Sources of Expectations
  - user's personal experiences
  - commonly accepted conventions
  - standards and regulations
2. Creating New Expectations
  - consistency and metaphors
  - intuitiveness vs training
3. Related User Accessibility Needs and Solutions

*Critique 3: Ch 5 Individualization due noon Friday Sept 23*

*Assignment 3: [Cultural and Linguistic Issues](#) due 12 noon Tues Sept 27*

### 5. Individualization [Sept 26 - 30, 2016]

1. Individualization Basics
  - customization and adaptation
  - profiles, settings, features
2. Sharing Individualization Settings
  - the Common Accessibility Profile (CAP)
  - Cloud for All
3. Related User Accessibility Needs and Solutions

*Critique 4: Ch 6 Approachability due noon Friday Sept 30*

*Project Proposal: due noon Monday Oct 3*

*Assignment 4: [OS-Based Accessibility Settings and Services](#) due 12 noon Tues Oct 4*

## Interaction Focused Principles

### 6. Approachability [Oct 3 - 7, 2016]

1. Barriers (partial and complete)
  - physical barriers

- psychological barriers
  - other barriers (e.g. socio-economic)
2. Navigation possibilities
    - removing barriers
    - alternate means of approaching
    - reassurance and support
  3. Related User Accessibility Needs and Solutions

*Critique 5: Ch 7 Perceivability due noon Friday Oct 7*

*Assignment 5: [Using a Screen Reader](#) due 12 noon Tues Oct 11*

## **7. Perceivability [Oct 12-14, 2016]**

1. Human Perception
  - perception vs understanding
  - sensory modalities
  - the diversity of devices
2. Modalities and Media
  - multi-modal and multi-media
  - modality shifting and loading
  - selecting modalities and media
3. Related User Accessibility Needs and Solutions
4. [W3C WAG Guidelines](#) related to perceivability, understandability, and controlability

*Critique 6: Ch 8 Understandability due noon Friday Oct 14*

*Assignment 6: [Colour Shifting and Shading](#) due 12 noon Tues Oct 18*

## **8. Understandability [Oct 17-21, 2016]**

1. Understanding "Understanding"
  - cognitive aspects
  - affective aspects
  - personality-based aspects
2. Designing Content
  - WCAG 2.0
  - principles of the presentation of information
  - dealing with complexity
3. Related User Accessibility Needs and Solutions

*Critique 7: Ch 9 Controllability due noon Friday Oct 21*

*Assignment 7: [Cognitive Issues](#) due 12 noon Tues Oct 25*

## **9. Controllability [Oct 24-28, 2016]**

1. Human control issues
  - means and modalities of control
  - strength and stamina
  - speed and precision
2. Designing Interactions
  - dialog/interaction principles
  - control actions and feedback
  - designing controls

### 3. Related User Accessibility Needs and Solutions

*Critique 8: Ch 10 Usability due noon Friday Oct 28*

*Project Analysis and Design: due noon Monday Oct 31*

*Assignment 8: [Using Voice Recognition](#) due 12 noon Tues Nov 1*

## Task Focused Principles

### 10. Usability [Oct 31 - Nov 4, 2016]

1. Effectiveness
  - correctness
  - completeness
  - appropriateness
2. Efficiency
  - time used
  - human effort
  - finances and materials
3. Satisfaction
  - attitudes
  - emotional effects
  - physiological effects
4. Related User Accessibility Needs and Solutions

*Critique 9: Ch 11 Error Tolerance due noon Friday Nov 4*

*Assignment 9: [Creating Alternative Text](#) due 12 noon Tues Nov 15*

*NOTE: University break Nov 7 - 11, 2016*

### 11. Error Tolerance [Nov 14-18, 2016]

1. Error Avoidance
  - risks, slips, and errors
  - active vs. passive guidance
  - user testing
2. Error Recovery
  - undo, redo, and related aids
3. Related User Accessibility Needs and Solutions

*Critique 10: Ch 12 Equitable use and Compatibility due noon Friday Nov 18*

*Assignment 10: [Using Head and Eye Tracking](#) due 12 noon Tues Nov 22*

## System Focused Principles

### 12. Equitable use and Compatibility [Nov 21-25, 2016]

1. Equitable use
  - identical manner of use
  - equivalent manner of use
2. Compatibility
  - Assistive Technologies

- Designing AIs

### 3. Related User Accessibility Needs and Solutions

*Critique 11: Ch 13-15 Applying Accessibility in Systems Development due noon Friday Nov 25*

*Project Evaluation: Due noon Monday Nov 28*

*Assignment 11: [Secondary Encodings](#) due 12 noon Tues Nov 29*

## 13. Applying Accessibility in Systems Development [Nov 28 - Dec 2, 2016]

1. Integrating Accessibility into Systems Development
2. Applying the Principles to Analysis
3. Applying Accessibility in Design
4. Evaluating Accessibility

## Student Project Presentations

### 14. Presentations in class [Dec 5, 2016]

*Revised Project: due 5:00 pm Thurs Dec. 8*

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## Policies in this Class

### Late Assignments, ciritques, and projects

- Late assignments, critiques, and parts of the project will automatically receive 0 marks, unless the student receives an extention from the instructor.
- Students receiving extentions may (at the discretion of the instructor) have their mark reduced by up to 10% for each day that the assignment, critique, or part of the project is late.
- Students with a sufficiently serious reason for being late with an assignment that is acceptable to the instructor may be allowed an extention. It is important to contact the instructor as soon as possible to request any extention.
- The instructor **will not** accept notes from Student Health Services as support for the student's reason for being late with an assignment.

### Missed Assignments, Critiques, and parts of the project

- Missed assignments and critiques will receive a mark of 0.

### Missed Examinations

- There are **no examinations** in this course.

## General Policies

### Incomplete Course Work and Final Grades

"When a student has not completed the required course work ... by the time of submission of the final grades, they may be granted an extension to permit completion of an assignment. . The student must apply to the instructor for such an extension and furnish satisfactory reasons for the deficiency."

**In the interim, the instructor will submit a computed percentile grade for the course which factors in the incomplete course work as a zero, along with a grade comment of INF (Incomplete Failure) if a failing grade.**

If an extension is granted and the required assignment is submitted within the allotted time, the instructor will submit a revised computed final percentage grade. The grade change will replace the previous grade and any grade comment of INF (Incomplete Failure) will be removed.

For provisions governing examinations and grading, students are referred to the University Council Regulations on Examinations section of the Calendar.

(2011 University of Saskatchewan Calendar/Academic Courses Policy)

Further details of the Academic Course Policy can be found online at:  
<http://policies.usask.ca/policies/academic-affairs/academic-courses.php>

### **Academic Honesty**

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary Website and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should read and be familiar with the Regulations on Academic Student Misconduct (<http://www.usask.ca/secretariat/student-conduct-appeals/StudentAcademicMisconduct.pdf>) as well as the Standard of Student Conduct in

Non-Academic Matters and Procedures for Resolution of Complaints and Appeals (<http://www.usask.ca/secretariat/student-conduct-appeals/StudentNon-AcademicMisconduct.pdf>)

Academic honesty is also defined and described in the Department of Computer Science Statement on Academic Honesty (<http://www.cs.usask.ca/undergrad/honesty.php>).

For more information on what academic integrity means for students see the Student Conduct & Appeals section of the University Secretary Website at: <http://www.usask.ca/secretariat/student-conduct-appeals/forms/IntegrityDefined.pdf>

### **Examinations with Disability Services for Students (DSS)**

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Disability Services for Students (DSS) if they have not already done so. Students who suspect they may have disabilities should contact DSS for advice and referrals. In order to access DSS programs and supports, students must follow DSS policy and procedures. For more information, check <http://www.students.usask.ca/disability/>, or contact DSS at 966-7273 or [dss@usask.ca](mailto:dss@usask.ca).

Students registered with DSS may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through DSS by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by DSS.



EXAMINATIONS FOR STUDENTS WHO ARE BEING ACCOMMODATED BY THE DEADLINES ESTABLISHED BY DSS.

## **Recording of Lectures**

The instructor will not be recording lectures and will not provide approval to record lectures except if such recording is authorized by DSS.

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Date of last revision: July 14, 2016

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