Developing Accessible User Interfaces

Course Syllabus, 1.1, last revised 11/12/2020
* Note that this syllabus is subject to change. Students will be notified about any changes.

Course Logistics
Meeting Times:
Tuesdays and Thursdays, 10:10am – 12:00pm
Meeting Location: Zoom

Instructor Information

Instructor: Sarah Morrison-Smith, PhD
- E-mail address (preferred):   smorriso@barnard.edu (put "COMS 3162" in the subject)
- Office hours: TBD
- Office location: Zoom only
- Class Web site: Canvas only

I welcome you to contact me outside of class and student hours and I especially invite you to **contact me if you find yourself spending a lot of time without making any progress**. To make an appointment, send a formal email with the subject including "COMS 3162" and include your meeting goals, any relevant questions, and at least 3 proposed meeting times.

Teaching Assistant: TBD
- E-mail address: TBD
- Office hours: Zoom only
- Office location: TBD

Student Hours

Student hours can be scheduled via Calendly (https://calendly.com/acccessibility-2021/office-hours) during the hours below. Student hours must be scheduled **at least 2 hours in advance**. Additional hours can be scheduled by email. Please direct requests for additional hours to Dr. Morrison-Smith, who may delegate to the TA and Computational Fellows as needed. When requesting additional hours, **please specify at least 3 times when you are available**.

- Tuesdays and Thursdays 12–1pm EST
- Wednesdays 11 am–12pm EST
- Mondays 3–4 pm EST

Course Information

Prerequisites:
COMS W1004, W1005, or W1007

Catalog Descriptions:

- Course Number 3223 – Introduction to Developing Accessible User Interfaces– Points: 3
  Introduction to access technology and the development of accessible systems. In this course, students build and evaluate various access technologies. Topics include: text-to-speech, speech recognition, screen readers, screen magnification, alternative input, tactile displays, and web transformation. This course teaches students the deep inner workings of today's user interface technology and serve as a guide for building the user interfaces of the future.

Course Overview:

This class is based on the belief that everyone has the capability to design effective technology. Access technology (AT), technology that makes accessible what otherwise isn't, has the potential to increase autonomy and improve millions of people's ability to live independently. This potential is currently under-realized because the expertise needed to create the right AT is in short supply and the custom nature of AT makes it difficult to deliver inexpensively. This course teaches how AT is built to work within the tough technical and human constraints in which it must operate. As early adopters, people with disabilities have inspired a host of future user interface technologies, e.g., conversational assistants, text-to-speech, speech recognition, optical character recognition, predictive typing, tactile displays, etc. People with disabilities continue to be the first users of interface next-generation technologies that are gradually adopted widely. This course does not only teach you the deep inner workings of today's user interface technology but also serves as a guide for building the user interfaces of the future. Topics include: Text-to-Speech, Speech Recognition, Screen Readers, Screen Magnification, Alternative Input, Tactile Displays, Web Transformation, and Disability Studies.

In this class, you'll be exposed to a wide range of interactive accessible technology, learn how it is built, and practice building it using web elements such as HTML, CSS, and JavaScript. This is directly beneficial if you want to have impact in this important area, and broadly beneficial to anyone who wants to build interactive systems. **No prior experience with HTML CSS, or Javascript is necessary, though it is beneficial. Students should not take this class unless they have completed at least one semester of programming.** The course gives you the experience to build a variety of different kinds of interactive systems that go far beyond the standard graphical user interfaces of today. This is useful if you intend to build them, or if you want to understand the technological constraints for designing them.

Course Components:

This course involves the following components:
- Lectures: core information about AT will be presented, discussed.
- Readings: research papers and other readings will be assigned and discussed.
- Assignments: some will be programming assignments designed to help you understand how AT works at a deep level, others will be meant to introduce you to AT and disability studies.

Learning Outcomes:

By the end of this course, students will be able to:
- *Design and build* access technology
- *Characterize* access technology
- *Assess* access technology evaluations and other disability studies

Course Materials

Textbooks Required:

There are no textbooks required for this course. All course readings will be made available on Canvas.

Affordable Access to Course Texts:

All students deserve to be able to access course texts. The high costs of textbooks and other course materials prohibit access and perpetuate inequity, and Barnard librarians are partnering with students, faculty, and staff to increase access. By the first day of advance registration for each term, you should be able to view on CourseWorks information provided by your faculty about required texts (including ISBN or author, title, publisher and copyright date) and their prices. Once you have selected your classes, here are some cost-free methods for accessing course texts, recommended by the Barnard Library: find out if your faculty has placed the texts on reserve at Barnard Library or another Columbia library, and look for course texts using *CLIO* (library catalog), *Borrow Direct* (request books from partner libraries), *Interlibrary Loan* (request book chapters from any library), and *NYPL*. Students with financial need or insecurity can check items out from the FLIP lending libraries in the Barnard Library and Butler Library and can consult with the *Dean of Studies* and the *Financial Aid Office* about additional affordable alternatives for getting access to course texts. Talk with your librarian and visit the *Barnard Library Textbook Affordability guide* (*library.barnard.edu/textbook-affordability*) for more details.

Software Required:

The following free or trial software packages may be necessary to be installed by students on their laptops or used via online services over the course of the semester:
- IDE suitable for client-side web development (e.g., Jetbrains WebStorm, Eclipse, Sublime Text, Google Dart etc.)

Course Outline
Tentative Schedule: subject to change

Week	Date	Topics	Assignments/Milestones
1	1/12	Introduction: Overview of accessibility and its relationship to computation	Assigned: Assign. 1
1	1/14	Accessibility and "The Web"	*Registration deadline 15st* Assigned: Assign. 2
2	1/19	Assignment 1 Presentations	Due: Assign 1 in class
2	1/21	Text-to-speech	Due: Assign. 2 @ 11:59 PM Sunday Assigned: Assign. 3 *Last day to drop a course 25th*
3	1/26	Screen Readers	
3	1/28	Magnification	Due: Assign. 3 @ 11:59 PM Sunday Assigned: Assign. 4
4	2/2	Computer Vision	
4	2/4	Input	Due: Assign. 4, @ 11:59 PM Sunday Assigned: Assign 5 *Last day to withdraw 8th*
5	2/9	Tactile Displays	
5	2/11	Disability studies	Due: Assign. 5, @ 11:59 PM Sunday Assigned: Assign. 6
6	2/16	Language and Cognitive Disabilities	
6	2/18	Technology and Mental Health	Due: Assign. 6, @ 11:59 PM Sunday
7	2/23	NO FINAL	
7	2/25	NO FINAL	

Tentative Reading List: subject to change

Week	Readings (available on Canvas and the ACM Digital Library, to be discussed in class the week of)
1	No Readings!
2	Volker Sorge, Charles Chen, T. V. Raman, and David Tseng. 2014. Towards making mathematics a first class citizen in general screen readers. In Proceedings of the 11th Web for All Conference (W4A '14). ACM, New York, NY, USA, , Article 40 , 10 pages. DOI: http://dx.doi.org/10.1145/2596695.2596700. 10 pages
3	Hernisa Kacorri, Kris M. Kitani, Jeffrey P. Bigham, and Chieko Asakawa. 2017. People with Visual Impairment Training Personal Object Recognizers: Feasibility and Challenges. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 5839-5849. DOI: https://doi.org/10.1145/3025453.3025899. 12 pages
4	Sarit Felicia Anais Szpiro, Shafeka Hashash, Yuhang Zhao, and Shiri Azenkot. 2016. How People with Low Vision Access Computing Devices: Understanding Challenges and Opportunities. In Proceedings of the 18th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '16). ACM, New York, NY, USA, 171-180. DOI: https://doi.org/10.1145/2982142.2982168. 10 pages
5	Luz Rello. 2015. Dyslexia and web accessibility: synergies and challenges. In Proceedings of the 12th Web for All Conference (W4A '15). ACM, New York, NY, USA, Article 9, 4 pages. DOI: https://doi.org/10.1145/2745555.2746655. 4 pages.
6	Rui Wang, Min S. H. Aung, Saeed Abdullah, Rachel Brian, Andrew T. Campbell, Tanzeem Choudhury, Marta Hauser, John Kane, Michael Merrill, Emily A. Scherer, Vincent W. S. Tseng, and Dror Ben-Zeev. 2016. CrossCheck: toward passive sensing and detection of mental health changes in people with schizophrenia. In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '16). ACM, New York, NY, USA, 886-897. DOI: https://doi.org/10.1145/2971648.2971740. 12 pages

Grading:

The following items will contribute to students' grades in this course:

Grade Category	Percentage	Letter	Range (%)
Individual		A	93–100
Assignment 1	15%	A-	90–92
Assignment 2	15%	B+	87–89
Assignment 3	15%	B	83–86
Assignment 4	15%	B-	80–82
Assignment 5	15%	C+	77–79
Assignment 6	15%	C	73–76
Class participation	10%	C-	70–72
		D+	67–69

| **Total** | **100%** | D | 63–66 |
| | | D- | 60–62 |

NOTE: A C- will not be a qualifying grade for maintaining good academic standing. The concept of satisfactory academic progress mandates that students maintain a minimum GPA of 2.0 or better (C or better). Note: an average of C- is equivalent to a GPA of 1.67 and therefore does not satisfy this requirement. For more information on grades and grading policies, please consult Barnard's policies regarding academic standing https://barnard.edu/grades-exams.

All final course grades will be rounded to the nearest whole number.

This course will use the Canvas e-Learning course management system via CourseWorks to post grades and to communicate with class members. If you have a question about the course that other students could benefit from hearing the answer, please post to the appropriate discussion thread on Canvas rather than sending individual emails to the instructor.

Grade reviews must be requested within one week of a grade being posted. After two weeks, no grade will be revisited. In the event of a grade review, the entire assignment will be reviewed. Grade reviews must be requested in writing with an explanation describing why student believes the grade received is incorrect. Similarly, **inquiries about missing grades must be made within one week of grades being posted**.

Honesty & Collaboration:
High-level questions can be discussed amongst each other and amongst the groups. Plagiarism (misrepresenting others' ideas as your own, can be fixed with simple citation) is not allowed in this course.

As for other courses at Barnard, offenders will be held to the Barnard Honor Code (see below) including reporting incidents to the Dean of Students. The results of this can include failing grades and disciplinary action (which can lead to expulsion).

Course Policies
Late Assignments:
All assignments will be assessed a late penalty of -10% for each day late. After 3 days, students will receive a 0. The only exception to this rule is if students contact the instructor **in writing before the assignment due date** to make arrangements for lateness. Excuses are not accepted. Notifications of mental or physical illness/injuries must be accompanied by a doctor's note.

Attendance:

Attendance will not be graded. Engagement in class discussions is graded, however, so if students must miss class, the instructor recommends sending an email to smorriso@barnard.edu requesting an exception. Students will still be required to read the weekly material and submit discussion questions on Canvas even if they can't attend class. If a student is sick or will be absent for a significant period of time, please contact the instructor to work out a way to catch up.

Make-ups:

Students who contact the professor **before the due date** with appropriate requests for extension and/or makeup assignments will be given an additional amount of time to make up late assignments equal to the time lost due to the unforeseen circumstance.

Incompletes:

Incompletes will be granted for only the most extreme circumstances, e.g. medical or family reasons. To be considered for an incomplete, the student **must** 1) let the professor know in advance that they are seeking an incomplete, and 2) provide documentation to support the request.

Classroom Expectations:

To be courteous to your fellow students, please:
- Turn all cell phone ringers to silent and step outside if you must take calls.
- Turn off all audible notifications on laptops and phones.
- Refrain from texting during class.
- Use laptops only for taking notes, looking up relevant information, or answering quiz questions (no Facebook, YouTube, Twitter, etc.).

Zoom Use

I recognize that learning remotely presents a series of challenges to fostering an accessible and inclusive educational experience. In order to address these difficulties, I am proposing the following practices. **You are encouraged but not required to keep your camera on during class sessions**, and no student will be penalized for choosing to disable their camera. Keep your microphone muted unless you are contributing to discussion in a small group or during a lecture. If you are having connectivity issues or if you have to log off before class ends, please review the lecture video when it is posted. If you are unable to stream the video, please contact me directly via email.

If you are comfortable discussing any circumstances that you anticipate affecting your education this semester, please feel free to set up an appointment with me during student hours. I will be recording all class sessions so that course content is accessible to all students but will pause the recording if sensitive topics are being discussed. Because I am recording the sessions and will be honoring students' requests to

pause recordings, **please refrain from recording them on your own**. This is essential to building a community of trust and a culture of respect for one another's privacy.

As your professor, I will be maintaining as much flexibility as possible under the extraordinary circumstances in which this course is taking place. **In return I ask for your patience, understanding, and willingness to share feedback with me about the practices that you believe will best support an inclusive and accessible classroom.**

Guest Lectures:
In this course, guest lecturers may be invited to present material related to their research or work, and how it relates to the course material. These are experts in their fields and are taking time out of their busy schedules to share their knowledge with you. Please respect their time and attend the guest lectures as you would any other meeting of the course.

College Policies and Resources

Honor Code:
Barnard students are bound by The Honor Pledge, established 1912, updated 2016, which states, "We, the students of Barnard College, resolve to uphold the honor of the College… We pledge to do all that is in our power to create a spirit of honesty and honor for its own sake."

The Honor Code (https://barnard.edu/dos/honorcode) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor. Note that failure to comply with this commitment will result in disciplinary action compliant with the Barnard

Academic Accommodations for Students with Disabilities:
If you believe you may encounter barriers to the academic environment due to a documented disability or emerging health challenges, please feel free to contact me and/or the Center for Accessibility Resources & Disability Services (CARDS). Any student with approved academic accommodations is encouraged to contact me during office hours or via email. If you have questions regarding registering a disability or receiving accommodations for the semester, please contact CARDS at (212) 854-4634, cards@barnard.edu, or learn more at barnard.edu/disabilityservices. CARDS is located in 101 Altschul Hall.

Wellness
It is important for undergraduates to recognize and identify the different pressures, burdens, and stressors you may be facing, whether personal, emotional, physical, financial, mental, or academic. We as a community urge you to make yourself—your own health, sanity, and wellness—your priority throughout this term and your career here. Sleep, exercise, and eating well can all be a part of a healthy regimen to cope with stress. Resources exist to support you in

several sectors of your life, and we encourage you to make use of them. Should you have any questions about navigating these resources, please visit these sites:

- http://barnard.edu/primarycare
- http://barnard.edu/counseling
- http://barnard.edu/wellwoman/about
- Stressbusters Support Network

Software Use

All faculty, staff, and students of Barnard College are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against Barnard's policies and rules, disciplinary action will be taken as appropriate. We, the members of the Barnard College community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.