

# Course Syllabus

## CS 466/566: Voice Assistants – Syllabus

### Class Description

This course will provide an introduction to voice technologies and how to design and build voice-enabled applications. We will learn the concepts, techniques, and frameworks that you will need to build fully functional chatbots and virtual assistants. Students will explore the conversational design process and how to build effective voice user interfaces (VUIs) and conversational user interfaces (CUIs). We will create voice-enabled applications and virtual assistants using Web Speech APIs, the Alexa Skills platform, the Google Assistant platform, DialogFlow, and the Google Actions SDK. Course assumes a working knowledge of JavaScript and Node.js or Python

### Prerequisites

Admission to the program.

### Class Objectives

- Understand how to create voice user interfaces.
- Work with the Web Speech API to gather voice user input and use speech recognition and speech synthesis to build a response for the user.
- Build voice-enabled applications and virtual assistants using the Alexa Skills and the Google Assistant platforms.

### Student Learning Outcomes

Upon the successful completion of this class, students will be able to:

1. Describe the concepts, tools, and techniques needed to build chatbots.
2. Explain the current hardware, software, and ecosystem surrounding chatbots, virtual assistants, and other voice-enabled apps.
3. Explain the general algorithms behind speech recognition and speech synthesis, and investigate the biases they perpetuate.
4. Apply the key concepts of voice user interfaces (VUIs) and conversational design.
5. Build several voice-enabled applications using different platforms (Alexa, Google Assistant, and web).

Graduate students are also responsible for:

1. Implement unit tests and a third party API to build a more robust voice assistant for the final project.
2. Conduct user testing to ensure the final application provides a practical and intuitive experience for the user.

## Class Topics & Schedule

Weeks	Topics	Assignments Due
Week 1 Jun 26-30	<b>Module 1</b> - Course Introduction, Voice First, the Voice Ecosystem	Module 1 Discussion: Introductions Quiz 1 (not graded)
Week 2 Jun 3-7	<b>Module 2</b> - Designing Voice User Interfaces (VUIs)	Module 2 Discussion: Using a Voice Assistant Quiz 2
Week 3 Jul 10-14	<b>Module 3</b> - Alexa Skills	<b>HW 1: Designing VUIs</b> Module 3 Discussion: Reflection on Designing VUIs
Week 4 Jul 17-21		Quiz 3
Week 5 Jul 24-28	<b>Module 4</b> - Dialogflow and Google Actions	<b>HW 2: Alexa Skills</b> Module 4 Discussion: Testing Your Alexa Skill
Week 6 Jul 31-Aug 4		Quiz 4
Week 7 Aug 7-11	<b>Module 5</b> - Speech Recognition, Speech Synthesis, and the Web Speech APIs	<b>HW 3: Dialogflow</b> Module 5 Discussion: Testing your Dialogflow Agent
Week 8 Aug 14-18	<b>Module 6</b> - Usability Testing	Module 6 Discussion: Share Your Final Project <b>Final Project</b> Quiz 5

## Coursework

The coursework will include weekly reading assignments, quizzes, and related discussions, which will take place in the Discussions section.

Additionally, there are three homework assignments. Students will choose a use case from the provided options, and complete the following assignments, each time building on the use case they selected.

- HW 1 - Designing VUIs
- HW 2 - Alexa Skills
- HW 3 - Google Actions

After finishing the homework assignments, students will start working on a final project. The final project can be a continuation of the homework assignment or a new project. It is recommended that students build an Alexa Skill, Google Action, or Dialogflow agent, since those are the tools and platforms we will learn about in the course.

## Additional Requirements for Graduate Students

Graduate students have to complete additional requirements on the final project to meet the graduate learning outcomes. They are expected to use a 3rd party API and implement unit tests to build a more robust application. Graduate students will also need to conduct user testing to ensure a more practical and intuitive experience for the user.

## Recommended Textbook

Designing Voice User Interfaces, Cathy Pearl, O'Reilly Media, 2017

## Grading Policy

- Discussion Topics - 15%
- Quizzes - 15%
  - The lowest score is automatically dropped
- Homework Assignments - 40%
  - Late Policy: 3 late days total to use between all three homework assignments; beyond that, there is a 20% penalty per late day.
- Final Project - 30%

**All work submitted in this class must be the student's original work. Plagiarism and academic misconduct will result in an 0 on the assignment in question. Incident report regarding plagiarism and academic misconduct will be submitted to the Conduct Office.**

## Grading Scale

Total Points Earned	Letter Grade
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93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
Below 60	F

## Access and Inclusion for Students with Disabilities

PSU values diversity and inclusion. My goal is to create a learning environment that is accessible, equitable, inclusive, and welcoming. I am committed to fostering mutual respect and full participation for all students. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. Additionally, the Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment. The DRC works with students who have physical, learning, cognitive, mental health, sensory, chronic illness, and other disabilities.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations.

If you already have accommodations, please contact me to make sure that I have received your DRC Faculty Notification Email so we can discuss your accommodations.

The DRC is located in 116 Smith Memorial Student Union, Suite 116. You can also contact the DRC at

 <http://voice.google.com/calls?>

503-725-4150 or you can call 503-734-1150. [DRC's website \(https://www.pdx.edu/disability-resource-center\)](https://www.pdx.edu/disability-resource-center).


## Academic Misconduct

**“(9) Academic Misconduct.** Academic Misconduct is defined as, actual or attempted, fraud, deceit, or unauthorized use of materials prohibited or inappropriate in the context of the academic assignment. Unless otherwise specified by the faculty member, all submissions, whether in draft or final form, must either be the Student’s own work, or must clearly acknowledge the source(s). Academic Misconduct includes, but is not limited to: (a) cheating, (b) fraud, © plagiarism, such as word for word copying, using borrowed words or phrases from original text into new patterns without attribution, or paraphrasing another writer’s ideas; (d) the buying or selling of all or any portion of course assignments and research papers; (e) performing academic assignments (including tests and examinations) in another person’s stead; (f) unauthorized disclosure or receipt of academic information; (g) falsification of research data (h) unauthorized collaboration; (i) using the same paper or data for several assignments or courses without proper documentation; (j) unauthorized alteration of student records; and (k) academic sabotage, including destroying or obstructing another student’s work.”

Any academic misconduct, including plagiarism, will result in severe penalties. All incidents of academic misconduct will be reported to the PSU Conduct Office. If you have questions, please contact me for clarification. You can also consult the [PSU Code of Student Conduct \(https://www.pdx.edu/dos/psu-student-code-conduct\)](https://www.pdx.edu/dos/psu-student-code-conduct) for more guidelines.

## Responding to Students in Distress

PSU is committed to providing students with an educational environment where students may thrive in their educational pursuits. Incidents of interpersonal violence or sexual harassment may create barriers to students completing their education. We at Portland State support students to help them overcome these barriers. PSU’s Dean of Student Life, Title IX Coordinator, Interpersonal Violence (IPV) Advocates and CARE team are committed to assisting students who have experienced any form of sexual harassment or interpersonal violence.

[Title IX of the Educational Act of 1972](http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf)  <http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf> requires educational institutions (PSU) to provide academic and employment support to students and/or employees, including student employees, who experience sexual harassment, sexual assault or any other form of interpersonal violence. Academic and employment support includes, but is not limited to,

- Providing additional time to complete assignments or to take exams;
- Completing the course without attending the lectures;

- Providing academic support, such as tutoring;
- Arranging to have extra time to complete or retake a course or withdraw from a course without an academic or financial penalty;
- Providing a No Contact Order (NCO) between the victim and the alleged perpetrator, where the victim and the alleged perpetrator may not contact each other;
- Changing the alleged perpetrator or the victim's course to prevent both students from being in the same course;
- Providing excused absence from employment with PSU for a reasonable time; and
- Changing hours of employment or department of employment at PSU.

PSU must provide these academic and/or employment supports whether or not the student decides to report the matter to the Office of the Dean of Student Life or the Office of Equity and Compliance. An IPV Confidential Advocate, the CARE Team Case Manager, the Assistant Dean/Director of Conduct and Community Standards or the Title IX Coordinator may contact a faculty member/instructor and/or a supervisor to arrange for academic and/or employment support for a student or employee who has experienced interpersonal violence. If a faculty member or supervisor has any questions about providing the necessary academic or employment support, the faculty member should contact PSU's Title IX and 504/ADA Coordinator, Rebecca Lawrence, at [titleixcoordinator@pdx.edu](mailto:titleixcoordinator@pdx.edu) or 503.725.4410.

If you have any questions about Title IX, please contact PSU's Title IX Coordinator, Rebecca Lawrence at [titleixcoordinator@pdx.edu](mailto:titleixcoordinator@pdx.edu) or 503.725.4410. Rebecca's office is located at 1600 SW 4th Ave, In the Richard and Maureen Neuberger Center RMNC - Suite 830. Title IX pertains to any form of sex/gender discrimination, discriminatory harassment, sexual harassment or sexual violence.