

**University of Florida**  
**Herbert Wertheim College of Engineering**  
**Department of Computer & Information Science & Engineering**  
**Course Number: CIS 4930/6930**

**Dialogue Systems and Natural Language Interfaces**

Fall 2017

Delivery Format: On-Campus

Room: CSE E119      Time: MWF 9:35 - 10:25

Course Website: Canvas (elearning.ufl.edu)

Instructor: Dr. Kristy Elizabeth Boyer -- [keboyer@ufl.edu](mailto:keboyer@ufl.edu)

Instructor Office Location: CISE 430. Office hours by appointment.

Email Address: [keboyer@ufl.edu](mailto:keboyer@ufl.edu)

Teaching Assistant: Joseph B. Wiggins -- [jbwiggi3@ufl.edu](mailto:jbwiggi3@ufl.edu)

TA Office Location: CSE 454

TA Office Hours: Tuesday 9:30-11:00 AM; Wednesday 10:30-12:00 AM

**Class Web Sites:**

We will utilize Piazza.com, an online discussion system for posting course materials (syllabus, slides, readings) and for discussion. Our class group is available only to students enrolled in the class. Within the first week of class, you will receive (at your @ufl.edu email address) an invitation to join the Piazza group. Students are responsible for all material, notifications, or instructions posted by teaching staff to Piazza. (Note that you can set your preferences in Piazza to send you emails for new posts.) Students are strongly encouraged to post their questions to Piazza, and to help answer other students' questions via the Wiki-style answering tool.

We will utilize Canvas for collecting assignments that students turn in, and for viewing your grades.

**Prerequisites:** Undergraduate data structures class or equivalent, or permission of the instructor.

**Recommended Texts:**

Speech & Language Processing, 2nd edition, by Jurafsky & Martin

Voice User Interface Design by Cohen, Giangola, Balogh

**PURPOSE AND OUTCOME**

The purpose of this course is to build expertise in dialogue systems and natural language interfaces.

**Course Overview**

Dialogue systems play an increasingly important role in our daily lives. In this course, we will learn step-by-step how spoken dialogue systems are created, including automatic speech recognition and generation, natural language understanding techniques, dialogue management and domain modeling, and voice user interface design. Students will work in groups to complete a final project that applies and extends what they have learned in class. The course features an undergraduate and a graduate track. At the completion of the class, students will have a broad set of knowledge and skills that they can apply in any situation that involves processing natural language. The course format will consist of lectures,

in-class discussions, and student presentations. Examinations will consist of material covered in lectures and projects.

### **Course Objectives and/or Goals**

At the end of this course, students will be able to:

- Design voice user interfaces and dialogue systems that follow best practices
- Compare and contrast different types of dialogue managers and dialogue personas
- Implement dialogue understanding pipelines including speech recognition; part of speech tagging; dialogue act tagging; response selection; and speech generation.
- Describe the current state of the art in commercial and research dialogue systems
- Annotate and conduct agreement studies on dialogue corpora
- Plan and execute the evaluation of a dialogue system or voice user interface

### *What is expected of you?*

You are expected to actively engage in the course throughout the semester. You must come to class prepared by completing all out-of-class assignments. This preparation gives you the knowledge or practice needed to engage in higher levels of learning during the live class sessions. If you are not prepared for the face-to-face sessions, you may struggle to keep pace with the activities occurring in the live sessions, and it is unlikely that you will reach the higher learning goals of the course. Similarly, you are expected to actively participate in the live class. Your participation fosters a rich course experience for you and your peers that facilitates overall mastery of the course objectives.

### **Examinations**

No electronic devices of any kind are permitted during tests. Make-up tests will be given only in the event of an absence excused as per university policy. Any make-up test will be comprehensive and will be held after the final day of class.

### **Project**

Each student must complete a term project as part of a group. This project will involve implementing a fully functional dialogue system or voice user interface, or performing novel research analyses on a data set of spoken or textual dialogue, with appropriate literature review to inform the analyses.

In order to ensure progress is made throughout the semester, several presentations will be made by project teams. First, they will propose their projects and receive approval and/or feedback from the teaching staff regarding scope and plans. Second, teams will provide a project waypoint update in which they present their incremental progress. When the dialogue systems are complete, students will bring demo versions to class for an evaluation “round robin” which will facilitate data collection for evaluating the dialogue system using techniques learned in class. Both types of projects require a project writeup formatted in a computer science conference paper format of the team’s choosing. The final project writeup must be between 8-10 pages in length. For systems projects, it will include a description of the system and its evaluation results. Source code must be made available to the instructor upon request. For data analysis projects, the writeup must follow the expectations of a traditional conference paper including related work, methodology, and presentation of results. Data, processing scripts, and raw results of statistical analyses must be made available to the instructor for viewing and inspection upon request. Final project presentations will be held during the final examination period as indicated in the course schedule below.

### **Late Policy and Homework “Slip” Days**

Late assignments will not be accepted. The student will receive a grade of zero on an assignment if it is not received on or before the due date. However, at the beginning of the semester, each student will be issued two “slip days,” which can be applied to homework exercises. Homework exercises are given in class and do NOT include project proposals, final reports, presentations, tests, or assignments whose due date is listed below in the course schedule. When applied, one slip day provides one 24-hour extension on an assignment, with no grade penalty. No explanation is required regarding the reason for using the slip day.

Procedure for applying a slip day:

1. Submit the homework up to 24 hours past the due date (which will use up one slip day) or up to 48 hours past the due date (which will use up two slip days).
2. Email the TA to notify him that you are applying your slip day(s). Make the title of the email “CISE 4930/6930: [INSERT NAME] - Slip Day for [ASSIGNMENT NAME]”. No additional explanation is required.
3. After both slip days have been used up, any late assignments of any type will receive a grade of zero.

Because extenuating circumstances can occur at any time, it is strongly recommended that students NOT use their slip days in avoidable circumstances. Students who have already used their slip days will not be permitted to turn in late assignments, and the late assignment will receive a grade of zero. Late assignments due to excused absences require the use of slip days unless prior arrangements are made.

### **Academic Integrity**

A student shall be guilty of a violation of academic integrity if he or she:

- Represents the work of others as his or her own.
- Obtains assistance in any academic work from another individual in a situation in which the student is expected to perform independently.
- Gives assistance to another individual in a situation in which that individual is expected to perform independently.
- Offers false data in support of laboratory or field work.
- Any violation associated with an examination or quiz will result in a failing grade for the course. Project-related offenses may incur a reduction of up to the equivalent of two letter grades in the course grade. Homework-related offenses will incur a grade of a negative 100% on the assignment along with further penalties. All violations will be reported to the Office of the Dean of Students, which may impose penalties beyond those by the instructor.

### **Plagiarism**

The Code of Student Conduct defines plagiarism as “*submitting written materials without proper acknowledgment of the source*” or “*deliberate attribution to, or citation of, a source from which the referenced material was not in fact obtained.*” Instances of plagiarism will be treated as violations of academic integrity and will be dealt with as described above.

### **DESCRIPTION OF COURSE CONTENT**

The course will begin by examining some of the underlying tenets of human-human dialogue, and then move on to an introduction to basic natural language processing. The topics and schedule listed below are subject to change.

Class	Date(s)	Topic(s)	Notes
	8/21	Readings: Voice User Interface Design Chapters 1-2; Jurafsky & Martin Chapter	
	8/23	Intro: what's a dialogue system?	
	8/25	Probability refresher	
	8/28	Basics of language modeling	
	8/30	ASR	
	9/1	ASR	
	9/4	Labor Day Holiday	
	9/6	Overview of Linguistics	
	9/8	[Update: No class due to hurricane]	
	9/11	[Update: No class due to hurricane] NLU (tokenization, POS tagging)	
	9/13	[Update: No class due to hurricane]	
	9/15	Cont.	Due by 11:59 PM on 9/15: Homework 1
*	9/18	Speech act theory	
*	9/20	Automated approaches to DA Classification	
*	9/22	Kappa	
	9/25	HMMs	
	9/27	NLU (semantics)	
	9/29	Dialogue Management overview (models)	
*	10/2	Dialogue evaluation studies	
*	10/4	Exam 1: Rescheduled due to hurricane PARADISE Dialogue evaluation framework	
	10/6	Holiday: Homecoming!	

*	10/9	Neural net architectures	
	10/11	Natural language generation	Due by 11:59 PM on 10/11: Homework 2
	10/13	Persona design (VUI Ch 6)	Due by 5:00 PM on 10/13: Group Project Proposals
	<b>10/16</b>	<b>Project proposal Presentations</b>	
	<b>10/18</b>	<b>Project proposal Presentations</b>	
*	10/20	<b>EXAM 1 (New date - covers material through 10/4 in class)</b>	
	10/23	Development, testing & tuning methodologies (VUI Ch 15)	
	10/25	Speech generation (how it works)	
	10/27	Speech generation (practical, off-the-shelf tools)	
**	10/30	Project Working Day	
	11/1	The Linguistics of Conversation	
*	11/3	Minimizing cognitive load (VUI Ch 8)	Due by 5:00 PM on 11/3: Group Project Waypoint Updates
	<b>11/6</b>	<b>Project Waypoint Updates</b>	
	<b>11/8</b>	<b>Project Waypoint Updates</b>	
	<b>11/10</b>	<b>Holiday: Fall Break</b>	
	11/13	Critical demos of existing dialogue systems	
	11/15	Late-Breaking Work from the Dialogue System Community	
*	11/17	Project/Homework Working Session	
	11/20	Late-Breaking Work from the Dialogue System Community	Due by 11:59 PM 11/20: Homework 3
	<b>11/22</b>	<b>Thanksgiving break</b>	

	11/24	Thanksgiving break	
	11/27	Late-Breaking Work from the Dialogue System Community	
	11/29	EXAM 2	
	12/1	Late-Breaking Work from the Dialogue System Community	
	12/4	<b>Evaluation Round-Robin</b>	
	12/6	<b>Evaluation Round-Robin</b>	
	12/13	<b>Final Project Presentations</b> 3:00-5:00pm	Due by 11:59 PM 12/11: Project Report  Due by 5:00 PM on 12/12: Final Project Presentation slides

## ACADEMIC REQUIREMENTS AND GRADING

### Weights for course activities are:

Midterm #1 20%

Midterm #2 20%

Project proposal 5%

Project waypoint update 5%

System evaluation round robin success 5%

Project report 20%

Final project presentation 5%

Homework exercises 20% (5% each)

*BONUS for participating in research studies\* 2%*

\*Opportunities to volunteer for research will become available as the semester progresses. These are not necessarily coordinated by the teaching staff of this course but by other approved UF researchers.

Point system used (i.e., how course points translate into letter grades).

<b>If &gt; points</b>	93	90	87	83	80	77	73	70	67	63	60	other
<b>Letter Grade</b>	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at:

<http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### **Class Attendance**

Students are expected to attend and actively participate in every class session. Faculty are bound by the UF policy for excused absences. For information regarding the UF Attendance Policy see the Registrar website for additional details: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

### **Communication Guidelines**

ALL non-private communication is to take place on piazza. Private communication pertaining to course grades or sensitive matters is to be sent through email with a subject line CISE 4930/6930: [Student Name] - [2-3 word subject of email]

For example,

Subject: CISE 4930/6930: Sally Ride - Slip Day for HW3

### **Academic Integrity**

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

**“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”**

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

**“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

<http://gradschool.ufl.edu/students/introduction.html>

### **Online Faculty Course Evaluation Process**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### **SUPPORT SERVICES**

### **Accommodations for Students with Disabilities**

If you require classroom accommodation because of a disability, you must register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class. The Dean of Students Office will provide documentation of accommodations to you, which you then give to me as the instructor of the course to receive accommodations. Please make sure you provide this letter to me by the end of the second week of the course. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from:  
Alachua County Crisis Center  
(352) 264-6789  
<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>
- Do not wait until you reach a crisis to come in and talk with a care provider. They have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.