Cover Sheet: Request 14296

CIS 4XXX 3D Audio for Computer Interfaces - Undergraduate Students

Info

Process	Course|New|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Kyla McMullen drkyla@ufl.edu
Created	9/28/2019 5:41:40 PM
Updated	5/13/2021 4:37:18 PM
Description of request	The purpose of this request is to add a new Course entitled "3D Audio for Computer Interfaces" to the undergraduate curriculum.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Computer and Information Science and Engineering 19140000	Christina Gardner-McCune		4/23/2021
No document changes					
College	Approved	ENG - College of Engineering	Heidi Dublin	Approved by HWCOE Curriculum Committee and Faculty Council	5/13/2021
3D-Audio-Undergraduate-Syllabus-for-CN.pdf 3D-Audio-Graduate-Syllabus-for-CN.pdf					5/3/2021 5/3/2021
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			5/13/2021
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Catalog					
No document changes					
Student Academic Support System					
No document changes					
College Notified					
No document changes					

Original file: Cover sheet.pdf

Course|New for request 14296

Info

Request: CIS 4XXX 3D Audio for Computer Interfaces - Undergraduate Students
Description of request: The purpose of this request is to add a new Course entitled "3D Audio for Computer Interfaces" to the undergraduate curriculum.
Submitter: Christina Gardner-McCune gmccune@ufl.edu
Created: 3/30/2021 9:30:09 AM
Form version: 4

Responses

Recommended Prefix
Enter the three letter code indicating placement of course within the discipline (e.g., POS, ATR, ENC). Note that for new course proposals, the State Common Numbering System (SCNS) may assign a different prefix.

Response:
CIS

Course Level
Select the one digit code preceding the course number that indicates the course level at which the course is taught (e.g., 1=freshman, 2=sophomore, etc.).

Response:
4

Course Number
Enter the three digit code indicating the specific content of the course based on the SCNS taxonomy and course equivalency profiles. For new course requests, this may be XXX until SCNS assigns an appropriate number.

Response:
XXX

Category of Instruction
Indicate whether the course is introductory, intermediate or advanced. Introductory courses are those that require no prerequisites and are general in nature. Intermediate courses require some prior preparation in a related area. Advanced courses require specific competencies or knowledge relevant to the topic prior to enrollment.

Response:
Intermediate

- *1000 level = Introductory undergraduate*
- *2000 level = Introductory undergraduate*
- *3000 level = Intermediate undergraduate*
- *4000 level = Advanced undergraduate*
- *5000 level = Introductory graduate*
- *6000 level = Intermediate graduate*
- *7000 level = Advanced graduate*
- *4000/5000= Joint undergraduate/graduate*
- *4000/6000= Joint undergraduate/graduate*

**Joint undergraduate/graduate courses must be approved by the UCC and the Graduate Council)*

Lab Code
Enter the lab code to indicate whether the course is lecture only (None), lab only (L), or a combined lecture and lab (C).

Response:
None

Course Title
Enter the title of the course as it should appear in the Academic Catalog.

Response:
3D Audio for Interfaces

Transcript Title
Enter the title that will appear in the transcript and the schedule of courses. Note that this must be limited to 21 characters (including spaces and punctuation).

Response:
3D Audio 4 Interfaces

Degree Type
Select the type of degree program for which this course is intended.

Response:
Baccalaureate

Delivery Method(s)
Indicate all platforms through which the course is currently planned to be delivered.

Response:
On-Campus

Co-Listing
Will this course be jointly taught to undergraduate, graduate, and/or professional students?

Response:
Yes

Co-Listing Explanation
Please detail how coursework differs for undergraduate, graduate, and/or professional students. Additionally, please upload a copy of both the undergraduate and graduate syllabus to the request in .pdf format. For more information please see the Co-Listed Graduate Undergraduate Courses Policy.

Response:
The course covers the same topics each week for all students, however modifications are made for the semester project and research presentation.

Semester Project - In the course, each student will complete a group project in which they pick a user population (ex: visually impaired, children, elderly, musicians, etc.) and design a 3D audio system to suit some need for that population. Graduate students will complete projects in pairs (2) and undergraduate students work in groups of 4, however they are held to the same standards.

Research Presentations - Each graduate student will pick a syllabus topic and present a research paper that addresses that topic, once per semester. In addition, the graduate student project pair will write up (in their final report) an explanation of how they will apply the significant findings of the research paper in their final project.

Effective Term
Select the requested term that the course will first be offered. Selecting "Earliest" will allow the course to be active in the earliest term after SCNS approval. If a specific term and year are selected, this should reflect the department's best projection. Courses cannot be implemented retroactively, and therefore the actual effective term cannot be prior to SCNS approval, which must be obtained prior to the first day of classes for the effective term. SCNS approval typically requires 2 to 6 weeks after approval of the course at UF.

Response:
Fall

Effective Year
Select the requested year that the course will first be offered. See preceding item for further information.

Response:
2021

Rotating Topic?
Select "Yes" if the course can have rotating (varying) topics. These course titles can vary by topic in the Schedule of Courses.

Response:
No

Repeatable Credit?
Select "Yes" if the course may be repeated for credit. If the course will also have rotating topics, be sure to indicate this in the question above.

Response:
No

Amount of Credit
Select the number of credits awarded to the student upon successful completion, or select "Variable" if the course will be offered with variable credit and then indicate the minimum and maximum credits per section. Note that credit hours are regulated by Rule 6A-10.033, FAC. If you select "Variable" for the amount of credit, additional fields will appear in which to indicate the minimum and maximum number of total credits.

Response:
3

S/U Only?
Select "Yes" if all students should be graded as S/U in the course. Note that each course must be entered into the UF curriculum inventory as either letter-graded or S/U. A course may not have both options. However, letter-graded courses allow students to take the course S/U with instructor permission.

Response:
No

Contact Type
Select the best option to describe course contact type. This selection determines whether base hours or headcount hours will be used to determine the total contact hours per credit hour. Note that the headcount hour options are for courses that involve contact between the student and the professor on an individual basis.

Response:
Regularly Scheduled

- *Regularly Scheduled [base hr]*
- *Thesis/Dissertation Supervision [1.0 headcount hr]*
- *Directed Individual Studies [0.5 headcount hr]*
- *Supervision of Student Interns [0.8 headcount hr]*
- *Supervision of Teaching/Research [0.5 headcount hr]*
- *Supervision of Cooperative Education [0.8 headcount hr]*

Contact the Office of Institutional Planning and Research (352-392-0456) with questions regarding contact type.

Weekly Contact Hours
Indicate the number of hours instructors will have contact with students each week on average throughout the duration of the course.

Response:
3

Course Description
Provide a brief narrative description of the course content. This description will be published in the Academic Catalog and is limited to 50 words or fewer. See course description guidelines.

Response:
Students will understand the role of audio in human-computer interaction, the physiological and computational aspects of rendering accurate spatial audio, the tradeoffs when designing 3D audio applications. Students will develop a 3D audio system, learn and discuss research trends, and hone presentation and writing skills, as evidenced through project milestones.

Prerequisites
Indicate all requirements that must be satisfied prior to enrollment in the course. Prerequisites will be automatically checked for each student attempting to register for the course. The prerequisite will be published in the Academic Catalog and must be formulated so that it can be enforced in the registration system. Please note that upper division courses (i.e., intermediate or advanced level of instruction) must have proper prerequisites to target the appropriate audience for the course.
Courses level 3000 and above must have a prerequisite.

Response:

COP 3503 (C) or 3504 (C).

Completing Prerequisites on UCC forms:

• Use "&" and "or" to conjoin multiple requirements; do not used commas, semicolons, etc.
• Use parentheses to specify groupings in multiple requirements.
• Specifying a course prerequisite (without specifying a grade) assumes the required passing grade is D-. In order to specify a different grade, include the grade in parentheses immediately after the course number. For example, "MAC 2311(B)" indicates that students are required to obtain a grade of B in Calculus I. MAC2311 by itself would only require a grade of D-.
• Specify all majors or minors included (if all majors in a college are acceptable the college code is sufficient).
• "Permission of department" is always an option so it should not be included in any prerequisite or co-requisite.

Example: A grade of C in HSC 3502, passing grades in HSC 3057 or HSC 4558, and major/minor in PHHP should be written as follows:
HSC 3502(C) & (HSC 3057 or HSC 4558) & (HP college or (HS or CMS or DSC or HP or RS minor)

Co-requisites
Indicate all requirements that must be taken concurrently with the course. Co-requisites are not checked by the registration system. If there are none please enter N/A.

Response:
N/A

Rationale and Placement in Curriculum
Explain the rationale for offering the course and its place in the curriculum.

Response:
This is a new course in the Computer Science Curriculum. In line with UF and the Herbert Wertheim College of Engineering's preeminence focus on Human-Centered Computing, this course would teach students to design for and consider the human who is hearing audio in various types of interfaces. Students will be able to use 3D audio to convey meaning in new computer interfaces and applications.

Course Objectives
Describe the core knowledge and skills that student should derive from the course. The objectives should be both observable and measurable.

Response:
Upon completion of this course, students will be able to:
- Articulate the role of audio in human-computer interaction
- Describe the physiological and computational aspects of rendering accurate spatial audio
- Articulate the tradeoffs and challenges when designing 3D audio applications
- Design and analyze a 3D audio application
- Describe current trends in 3D audio research and development
- Verbally present project progress at completed project milestones
-

Disseminate written project progress through a technical report

Course Textbook(s) and/or Other Assigned Reading

Enter the title, author(s) and publication date of textbooks and/or readings that will be assigned. Please provide specific examples to evaluate the course.

Response:
There is no required textbook to purchase for the course, as the readings will be taken from book "3D Sound for Virtual Reality and Multimedia" (3DS4VRAM) and other relevant articles that will be provided by the instructor via Canvas. Some of the past readings have come from relevant audio topics in the ACM-SIGCHI (The Special Interest Group on Computer–Human Interaction) Conference, JASA (Journal of the Acoustical Society), and ICAD (International Conference for Auditory Display) venues.

Weekly Schedule of Topics
Provide a projected weekly schedule of topics. This should have sufficient detail to evaluate how the course would meet current curricular needs and the extent to which it overlaps with existing courses at UF.

Response:
Course Introduction
Sound (theoretically)
Sound in the Interface & Audio Interfaces
3D Audio Interfaces
Sound Digitally
3D Audio Implementation
3D Audio Cues (theoretically)
3D Audio Cues (digitally)
Industry Field Trip
Head-Related Transfer Functions (HRTFs)
HRTF Measurement and Databases
3D Audio Perception
3D Sound Localization
Binaural Recordings
Azimuth Estimation and Localization
HRTF Customization
Virtual Sound Search and Training
Sonification
Psychophysics Research Methods
Demo Day / Project Fair

Grading Scheme
List the types of assessments, assignments and other activities that will be used to determine the course grade, and the percentage contribution from each. This list should have sufficient detail to evaluate the course rigor and grade integrity. Include details about the grading rubric and percentage breakdowns for determining grades.

Response:
Overall Grading Scheme

Quizzes - 15%
Assignments (7) - 25%
Class Project - 60%

Class project: 60% divided as follows
Project Proposal Presentation - 5 %
Project Proposal Report - 5 %
Midterm-Project Presentation - 5 %
Midterm-Project Report - 5 %
Final Project Presentation - 5 %
Final Project Deliverable- 15 %
Final Project Report - 10 %
Peer Evaluation - 10 %

Instructor(s)
Enter the name of the planned instructor or instructors, or "to be determined" if instructors are not yet identified.

Response:
Dr. Kyla McMullen

Attendance & Make-up
Please confirm that you have read and understand the University of Florida Attendance policy.
A required statement statement related to class attendance, make-up exams and other work will be included in the syllabus and adhered to in the course. Courses may not have any policies which conflict with the University of Florida policy. The following statement may be used directly in the syllabus.

• Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Response:
Yes

Accomodations
Please confirm that you have read and understand the University of Florida Accommodations policy.
A statement related to accommodations for students with disabilities will be included in the syllabus and adhered to in the course. The following statement may be used directly in the syllabus:

• Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Response:
Yes

UF Grading Policies for assigning Grade Points
Please confirm that you have read and understand the University of Florida Grading policies.
Information on current UF grading policies for assigning grade points is require to be included in the course syllabus. The following link may be used directly in the syllabus:

• https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Response:
Yes

Course Evaluation Policy
Course Evaluation Policy
Please confirm that you have read and understand the University of Florida Course Evaluation Policy.
A statement related to course evaluations will be included in the syllabus. The following statement may be used directly in the syllabus:

• Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/public-results/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Response:
Yes

3D Audio for Interfaces

CIS 5XXX Section YYYY
Class Periods: Tuesday, periods 8-9, 3:00pm – 4:55pm
Thursday, period 9, 4:05pm – 4:55pm
Location: CSE AAAA
Academic Term: Fall 20NN

Instructor:
Dr. Kyla McMullen
drkyla@ufl.edu
352-392-1200
Office Hours: Tuesdays and Thursdays – 5:00pm – 6:30pm, CSE 530

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website
- Name, email address, office location, office hours
- Name, email address, office location, office hours

Course Description
Students will understand the role of audio in human-computer interaction, the physiological and computational aspects of rendering accurate spatial audio, the tradeoffs when designing 3D audio applications. Students will develop a 3D audio system, learn, and discuss research trends, and hone presentation and writing skills, as evidenced through project milestones.

Course Pre-Requisites / Co-Requisites
None.

Course Objectives
Upon completion of this course, students will be able to:
- Articulate the role of audio in human-computer interaction
- Describe the physiological and computational aspects of rendering accurate spatial audio
- Articulate the tradeoffs and challenges when designing 3D audio applications
- Design and analyze a 3D audio application
- Describe current trends in 3D audio research and development
- Verbally present project progress at completed project milestones
- Disseminate written project progress through a technical report

These objectives will be accomplished using lectures, selected reading, oral presentations, a group project, Group project report, and constant, iterative feedback from the professor and TA(s).

Materials and Supply Fees
None

Required Textbooks and Software
There is no required textbook to purchase for the course. The readings will be taken from the book "3D Sound for Virtual Reality and Multimedia" (3DS4VRAM) and other relevant articles provided by the instructor via Canvas. Some of the past readings have come from relevant audio topics in the ACM-SIGCHI (The Special Interest Group on Computer-Human Interaction) Conference, JASA (Journal of the Acoustical Society), and ICAD (International Conference for Auditory Display) venues.

Course Schedule

Week	Reading (to be completed before class)	Topic(s)	Assigned Work	Work Due
1	*(none)*	Course Introduction	**Syllabus Quiz, HW #1**	
	Andrew (2007)	Sound (theoretically)		**Syllabus Quiz**
2	*Frauenburger (2007)*	Sound in the Interface & Audio Interfaces	**Proposal Presentation, Proposal Report, HW#2**	**HW #1**
	(group assignment form)	Project Group Formation		
3	*Bellotti (2002)*	3D Audio Interfaces		
	(none)	Sound Digitally		**HW#2 - Sound Design**
4		3D Audio Implementation	**HW #3**	
	31-39 (3DS4VRAM)	3D Audio Cues (theoretically)		
5		**Proposal Presentations**		**Proposal Presentation**
		3D Audio Cues (digitally)		**Proposal Report**
6	*--none*	***Field Trip*** 		
	Cheng (2001)	Head-Related Transfer Functions (HRTFs)	**Midterm Presentation & Report**	
7	*Algazi (2001)*	HRTF Measurement and Databases	**HW #4**	**HW #3**
		Group Work Day		
8		**Midterm Presentations**		**Midterm Presentation**
		Group Work Day		**Midterm Report**
		Have a Great Spring Break 		
10		3D Audio Perception	**HW#5**	
		Localization		**HW #4**
11		Binaural Recordings		
		Azimuth Estimation and Localization		

12	*Seeber & Fastl, 2003* *Xu, 2007* *Wan, 2014*	HRTF Customization		**HW#5**
		Project work day		
13	*Be "familiar" with **all readings** in module*	Virtual Sound Search and Training	**HW #6 -** **HW #7 -** **Project and Peer Evaluation**	
		Project work day		
14	*Nasir, Barrass, Woroll*	Sonification AND Psychophysics Research Methods		
		Project Work Day		
15		**Final Presentations**		
		Final Presentations		
16		Demo Day / Project Fair		**HW #6** **HW #7** **Final Project Report & Deliverable**

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance: **Regular** and **punctual** attendance is expected (unless prior notice is discussed with the professor). Prior notice consists of an email with attached documentation concerning the reason for absence (away game, doctor's note, academic conference, court summons, etc.). All absences must be accompanied with proper documentation to avoid grade penalty. Attendance will be determined by participation in a short quiz at the beginning of each class. The quiz closes after the first 15 minutes of class, so if you are more than 15 minutes late, you will miss your opportunity to take the quiz.

Make-Up Work: Please make sure to make all arrangements to submit your work on time. In extremely rare circumstances and emergencies (for example: a student has been sick for an extended period), late assignments and documents may be accepted, however, proper documentation is required. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Regular extracurricular activity (e.g., participating in an out-of-town academic conference, away game) does not merit permission to submit late documents or assignments. If you are going to be away during a time when an assignment is due, meet with the professor to **arrange for early submission of the work**.

Evaluation of Grades

The **Total Course Grade** will be calculated as follows:

Quizzes	15%
Assignments	25%
Class Project	60%

Total	**100%**

The **Class Project** grade (from above) is calculated as follows:

Project Proposal Presentation	5 %
Project Proposal Report	5 %
Midterm-Project Presentation	5 %
Midterm-Project Report	5 %
Final Project Presentation	5 %
Final Project Deliverable	15 %
Final Project Report	10 %
Peer Evaluation	10 %

The Class Project components are described as follows:
In the course, each student will complete a group project in which they pick a user population (ex: visually impaired, children, elderly, musicians, etc.) and design a 3D audio scene to suit a need for that population. The professor will assign groups thematically. Each person will individually propose a project topic that they would like to work on. The professor will first group the students whose work most closely relates. If there is someone in the class who you have already identified a preference to work with, you may request them on the Project Topic Proposal. During the *Project Group Formation* class period, trades may be made between groups to achieve a desirable working group. You have the freedom to change or modify your topic once groups are solidified. If, at any point, the group dynamics are not working out, please notify the professor so that modifications can be made as soon as possible.

Graduate students will complete projects in pairs (2) and undergraduate students may work in groups of 4. Groups must speak with the professor if they would like to mix graduate and undergraduate students in a group. Occasionally, if the project is of substantial rigor (as assessed by the professor), undergraduate groups of 5 or graduate student groups of 3 may be allowed. However, prior approval from the professor is required.

Each project group will create a **Project Proposal Presentation** in which the project's purpose is outlined. A rubrics will be given to summarize the information expected. Presentations will be in video form, lasting about 5-7 minutes. A detailed, written version of this presentation is covered in the **Project Proposal Report**. About halfway through the semester, each project group will also present their intermediary work to the class during the **Midterm Project Presentation**. A rubric will be given to outline the information expected. Presentations will be in video form, lasting about 5-7 minutes. For the **Final Project Presentation**, each group will demo their project's functionality (on the final class day, named **Demo Day**), walk through the code, and answer the designated questions according to the rubric. A detailed, written version of this presentation is covered in the **Final Project Report**

For the **Project Proposal Presentation and** Midterm **Project Presentation**, all videos will be reviewed by the class. Each project group will receive constructive project feedback from members of the course. Feedback will be facilitated through the Peer Review functionality on Canvas. Immediately following the presentation video submission deadline, each student will receive another group's submission to provide feedback.

In addition to outer-group "feedback," each group member will fill out a Project and Peer Evaluation Form at the end of the class. This evaluation will detail your contribution to the group. Your project grade will largely depend on your adequate contribution to your group.

The Proposal, Midterm, and Final project guidelines are posted on Canvas. Although this is a technical class, you will be expected to write all documents related to homework and assignments using good, clear, and polished

English and grammar. If this expectation presents a challenge for you, it would be beneficial to visit the Writing Center on campus prior to submitting your work.

Graduate vs. Undergraduate option distinction

The course covers the same topics each week for all students, however modifications are made for the semester project and research presentation.

Class Project - In the course, each student will complete a group project in which they pick a user population (ex: visually impaired, children, elderly, musicians, etc.) and design a 3D audio system to suit some need for that population. Graduate students will complete projects in pairs (2) and undergraduate students work in groups of 4, however they are held to the same standards.

Research Presentations - Each graduate student will pick a syllabus topic and present a research paper that addresses that topic, once per semester. In addition, the graduate student project pair will write up (in their final report) an explanation of how they will apply the significant findings of the research paper in their final project.

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.

On all work submitted for credit by students 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." The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) 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 or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University 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 University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or email to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://care.dso.ufl.edu.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.

3D Audio for Interfaces
CIS 4XXX Section YYYY
Class Periods: Tuesday, periods 8-9, 3:00pm – 4:55pm
Thursday, period 9, 4:05pm – 4:55pm
Location: CSE AAAA
Academic Term: Fall 20NN

Instructor:
Dr. Kyla McMullen
drkyla@ufl.edu
352-392-1200
Office Hours: Tuesdays and Thursdays – 5:00pm – 6:30pm, CSE 530

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website
- Name, email address, office location, office hours
- Name, email address, office location, office hours

Course Description
Students will understand the role of audio in human-computer interaction, the physiological and computational aspects of rendering accurate spatial audio, the tradeoffs when designing 3D audio applications. Students will develop a 3D audio system, learn, and discuss research trends, and hone presentation and writing skills, as evidenced through project milestones.

Course Pre-Requisites / Co-Requisites
COP 3503C or 3504C.

Course Objectives
Upon completion of this course, students will be able to:
- Articulate the role of audio in human-computer interaction
- Describe the physiological and computational aspects of rendering accurate spatial audio
- Articulate the tradeoffs and challenges when designing 3D audio applications
- Design and analyze a 3D audio application
- Describe current trends in 3D audio research and development
- Verbally present project progress at completed project milestones
- Disseminate written project progress through a technical report

These objectives will be accomplished using lectures, selected reading, oral presentations, a group project, Group project report, and constant, iterative feedback from the professor and TA(s).

Materials and Supply Fees
None

Relation to Program Outcomes (ABET):
The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	**Coverage***
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Medium

2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	High
3. An ability to communicate effectively with a range of audiences	Medium
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	High
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

Required Textbooks and Software

There is no required textbook to purchase for the course, as the readings will be taken from the book "3D Sound for Virtual Reality and Multimedia" (3DS4VRAM) and other relevant articles that will be provided by the instructor via Canvas. Some of the past readings have come from relevant audio topics in the ACM-SIGCHI (The Special Interest Group on Computer-Human Interaction) Conference, JASA (Journal of the Acoustical Society), and ICAD (International Conference for Auditory Display) venues.

Course Schedule

Week	Reading (to be completed before class)	Topic(s)	Assigned Work	Work Due
1	*(none)*	Course Introduction	**Syllabus Quiz, HW #1**	
	Andrew (2007)	Sound (theoretically)		**Syllabus Quiz**
2	*Frauenburger (2007)*	Sound in the Interface & Audio Interfaces	**Proposal Presentation, Proposal Report, HW#2**	**HW #1**
	(group assignment form)	Project Group Formation		
3	*Bellotti (2002)*	3D Audio Interfaces		
	(none)	Sound Digitally		**HW#2 - Sound Design**
4		3D Audio Implementation	**HW #3**	
	31-39 (3DS4VRAM)	3D Audio Cues (theoretically)		
5		**Proposal Presentations**		**Proposal Presentation**
		3D Audio Cues (digitally)		**Proposal Report**
6	*--none*	***Field Trip***		

				
	Cheng (2001)	Head-Related Transfer Functions (HRTFs)	**Midterm Presentation & Report**	
7	*Algazi (2001)*	HRTF Measurement and Databases	**HW #4**	**HW #3**
		Group Work Day		
8		**Midterm Presentations**		**Midterm Presentation**
		Group Work Day		**Midterm Report**
		Have a Great Spring Break 		
10		3D Audio Perception	**HW#5**	
		Localization		**HW #4**
11		Binaural Recordings		
		Azimuth Estimation and Localization		
12	*Seeber & Fastl, 2003* *Xu, 2007* *Wan, 2014*	HRTF Customization		**HW#5**
		Project work day		
13	*Be "familiar" with **all readings** in module*	Virtual Sound Search and Training	**HW #6 -** **HW #7 -** **Project and Peer Evaluation**	
		Project work day		
14	*Nasir, Barrass, Woroll*	Sonification AND Psychophysics Research Methods		
		Project Work Day		
15		**Final Presentations**		
		Final Presentations		
16		Demo Day / Project Fair		**HW #6** **HW #7** **Final Project Report & Deliverable**

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance: **Regular** and **punctual** attendance is expected (unless prior notice is discussed with the professor). Prior notice consists of an email with attached documentation concerning the reason for absence (away game, doctor's note, academic conference, court summons, etc). All absences must be accompanied with proper documentation to avoid grade penalty. Attendance will be determined by participation in a short quiz at the beginning of each class. The quiz closes after the first 15 minutes of class, so if you are more than 15 minutes late, you will miss your opportunity to take the quiz.

Make-Up Work: Please make sure to make all arrangements to submit your work on time. In extremely rare circumstances and emergencies (for example: a student has been sick for an extended period), late assignments and documents may be accepted, however, proper documentation is required. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Regular extracurricular activity (e.g., participating in an out-of-town academic conference, away game) does not merit permission to submit late documents or assignments. If you are going to be away during a time in which an assignment is due, meet with the professor to **arrange for early submission of the assignment**.

Evaluation of Grades

The **Total Course Grade** will be calculated as follows:

Quizzes	15%
Assignments	25%
Class Project	60%
Total	**100%**

The **Class Project** grade (from above) will be calculated as follows:

Project Proposal Presentation	5 %
Project Proposal Report	5 %
Midterm-Project Presentation	5 %
Midterm-Project Report	5 %
Final Project Presentation	5 %
Final Project Deliverable	15 %
Final Project Report	10 %
Peer Evaluation	10 %

The Class Project components are described as follows:
In the course, each student will complete a group project in which they pick a user population (ex: visually impaired, children, elderly, musicians, etc.) and design a 3D audio scene to suit a need for that population. The professor will assign groups thematically. Each person will individually propose a project topic that they would

like to work on. The professor will first group the students whose work most closely relates. If there is someone in the class who you have already identified a preference to work with, you may request them on the Project Topic Proposal. During the *Project Group Formation* class period, trades may be made between groups to achieve a desirable working group. You have the freedom to change or modify your topic once groups are solidified. If, at any point, the group dynamics are not working out, please notify the professor so that modifications can be made as soon as possible.

Graduate students will complete projects in pairs (2) and undergraduate students may work in groups of 4. Groups must speak with the professor if they would like to mix graduate and undergraduate students in a group. Occasionally, if the project is of substantial rigor (as assessed by the professor), undergraduate groups of 5 or graduate student groups of 3 may be allowed. However, prior approval from the professor is required.

Each project group will create a **Project Proposal Presentation** in which the project's purpose is outlined. A rubrics will be given to summarize the information expected. Presentations will be in video form, lasting about 5-7 minutes. A detailed, written version of this presentation is covered in the **Project Proposal Report**. About halfway through the semester, each project group will also present their intermediary work to the class during the **Midterm Project Presentation**. A rubric will be given to outline the information expected. Presentations will be in video form, lasting about 5-7 minutes. For the **Final Project Presentation**, each group will demo their project's functionality (on the final class day, named **Demo Day**), walk through the code, and answer the designated questions according to the rubric. A detailed, written version of this presentation is covered in the **Final Project Report**

For the **Project Proposal Presentation and** Midterm **Project Presentation**, all videos will be reviewed by the class. Each project group will receive constructive project feedback from members of the course. Feedback will be facilitated through the Peer Review functionality on Canvas. Immediately following the presentation video submission deadline, each student will receive another group's submission to provide feedback.

In addition to outer-group "feedback," each group member will fill out a Project and Peer Evaluation Form at the end of the class. This evaluation will detail your contribution to the group. Your project grade will largely depend on your adequate contribution to your group.

The Proposal, Midterm, and Final project guidelines are posted on Canvas. Although this is a technical class, you will be expected to write all documents related to homework and assignments using good, clear, and polished English and grammar. If this expectation presents a challenge for you, it would be beneficial to visit the Writing Center on campus prior to submitting your work.

Graduate vs. Undergraduate option distinction

The course covers the same topics each week for all students, however modifications are made for the semester project and research presentation.

Class Project - In the course, each student will complete a group project in which they pick a user population (ex: visually impaired, children, elderly, musicians, etc.) and design a 3D audio system to suit some need for that population. Graduate students will complete projects in pairs (2) and undergraduate students work in groups of 4, however they are held to the same standards.

Research Presentations - Each graduate student will pick a syllabus topic and present a research paper that addresses that topic, once per semester. In addition, the graduate student project pair will write up (in their final report) an explanation of how they will apply the significant findings of the research paper in their final project**.**

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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." The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) 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 or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University 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 University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://care.dso.ufl.edu.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.