

Internet of Things (IoT) Design

EEL 5749, Sections CAMP, 1FE2, 2FED

Class Periods:

Tuesday, Period 4 (10:40 AM - 11:30 AM)

Thursday, Period 4-5 (10:40 AM - 12:35 PM)

Location:

On-Campus Section: Online (80-99%) or in person, NEB 201

EDGE Sections: Online (100%)

Academic Term: Fall 2021

Instructor:

Dr. Janise McNair

Email Address: mcnair@ece.ufl.edu (Contact using Canvas mail tool)

Office Phone Number: 352-392-2629

Office Hours: Tuesday and Wednesday 11:30am – 12:30pm, via Zoom

Teaching Assistant/Peer Mentor/Supervised Teaching Student: - TBD

Please contact through the Canvas website

Course Description

This course focuses on the design of IoT-based solutions for multi-discipline challenges. The course consists of lectures on the fundamental building blocks and protocols in IoT. Then the course will run as a hands-on, multi-discipline project-oriented course, with project discussions, presentations and demonstrations led by student teams. (3 credits)

Course Pre-Requisites / Co-Requisites

Graduate-level standing in science or engineering.

Course Objectives

The main objective of this course is to teach the fundamentals of the Internet of Things as a paradigm and to help students become developers in this realm. Then the course will run as a hands-on, system design project-oriented course, with project discussions, presentations and demonstrations led by student teams.

Materials and Supply Fees

Group project may require independent equipment purchase under \$100.

Required Textbooks and Software

- Title: Internet of Things: A Hands on Approach,
- Author: A. Bahga and V. Madisetti
- <http://www.internet-of-things-book.com>

Recommended Materials - N/A

Course Schedule

Week 1: Class Overview / Introduction to IoT / Intro to Course Project

Week 2: Project Discussion / IoT Design Methodology

Week 3: Building Blocks: Sensors, Actuators

Week 4: *Project Proposal Presentations*

Week 5: IoT Networking and Communications Basics

Week 6: IoT System Energy Consumption

Week 7: Protocols and Technologies: Zigbee, WiFi

Week 8: Protocols and Technologies: Bluetooth, RFID, LoRaWAN

Week 9: Review/Exam

- Week 10: IoT Protocols
- Week 11: Security in IoT
- Week 12: *Review Report Presentations*
- Week 13: *Progress Report Demonstrations*
- Week 14: Project Work / Thanksgiving Holiday
- Week 15: IoT Research
- Week 16: *Final Project Demonstrations*

Attendance Policy, Class Expectations, and Make-Up Policy

- Attendance
 - This is an EDGE (distance-learning) course. All lectures will be recorded and posted in Canvas.
 - Individual on-campus groups may be required to give presentations or demos in person.
 - Other than that, in-person attendance is not required. It is expected that each student will keep pace with the course, viewing all three hours of lecture by the end of each week. Online lecture quizzes may be assigned.
- Class Participation:
 - A class participation grade is assigned to reflect group participation (contribution to presentations and projects), discussion participation, and keeping up with the online class. Points may be deducted for disruptive behavior, tardiness, etc.
 - Excused absences must be consistent with university policies in the Graduate Catalog (<https://catalog.ufl.edu/graduate/regulations>) and require appropriate documentation. Additional information can be found here: <https://catalog.ufl.edu/graduate/regulations/>
 - It is the student's responsibility to independently obtain missed material from the Canvas site.
- Assignment Submission.
 - Electronic submission of assignments, uploaded to Canvas links, is required.
- Access to your own computer is required.
 - The project may require the download of a new programming or simulation tool to your computer.
 - Open-source software will be used for simulator/emulator assignments.
- Deadlines:
 - There will be no make-ups for assignments.
 - Late homework may be turned in. A 10% penalty per day will be applied.
 - There will be no make-up exams except for excused absences (see “Class Participation” above)
- Individual Effort
 - All assignments are assumed to be an individual effort unless otherwise specified by the instructor.
- Announcements and updates
 - Set Canvas to send announcements/updates to your gatorlink email. Check it regularly.
- Grade corrections
 - You have one week from the grade posting date of an assignment in Canvas to request a regrade of your assignment. Submit an email to the instructor using the Canvas Inbox tool. Provide the problem number(s) and describe the grading error(s). Without the problem number and description, or if Canvas Inbox is not used, the assignment will not be regraded.

Evaluation of Grades

Assignment	Percentage of Final Grade
Participation (keeping up with lecture content and contributing to group)	5%
Homework Sets (4)	15%
Exam	30%
Presentations (Proposal, Review Report)	20%
Demos (Progress, Final)	20%
Final Project Report	10%

Grading Policy

Percent	Grade	Grade Points
90.0 - 100	A	4.00
89.0 – 89.9	A-	3.67
87.0 - 88.9	B+	3.33
80.0 - 86.9	B	3.00
79.0 – 79.9	B-	2.67
77.0 - 78.9	C+	2.33
70.0 - 76.9	C	2.00
69.0 - 69.9	C-	1.67
67.0 - 68.9	D+	1.33
60.0 - 66.9	D	1.00
59.0 - 59.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

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.ua.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.ua.ufl.edu/public-results/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform,

including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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 Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. 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
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@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

Covid-19 Protocols:

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated. Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus. UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.

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: <https://counseling.ufl.edu>, 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 support, 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://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

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