Special Topic: Blockchain Methodologies and Design Principles in IoT
EEL 6935 Section 0001

**Class Periods:** T | Period 4 (10:40 AM - 11:30 AM), R | Periods 4-5 (10:40 AM - 12:35 PM)
**Location:** CHE 0316
**Academic Term:** Spring 2023

**Instructor:**
Name: Ann Ramirez (Gordon-Ross)
Email Address: anngordonross@ufl.edu
Office Text Number: 352-559-6004
Office Hours: By appointment only Tuesday/Thursday

**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**
(3 credit hours) The inherent security in Blockchain technology vastly opens research areas in secure and trusted computing in Internet of Things (IoT) devices. This course provides an overview of IoT design and Blockchain technology and delves into research challenges in realizing Blockchain in edge devices, focusing on hardware/software co-design principles.

**Course Pre-Requisites / Co-Requisites**
- EEL 5764: Computer Architecture
- Programming experience with any high-level language (e.g., C/C++/Python) and hardware design experience (e.g., VHDL, Verilog, SystemC, etc.)
- Digital design

**Course Objectives**
With Blockchain technology poised to be bigger than the Internet, this course will cover fundamental concepts and topics including, but not limited to, Blockchain security, smart contracts, non-fungible tokens (NFTs), Bitcoin mining, consensus protocols, etc. as it pertains to Internet of Things (IoT) edge device architectures. Students will gain fundamental knowledge in IoT design principles and practices in constrained environments. Due to the rapidly advancing Blockchain field, current publications and relevant material will be selected to augment lecture material. Students select a research topic, and present selected papers and write a short research paper on that topic, participate in open discussion forums. Special guest speakers will be included.

**Materials and Supply Fees**
None

**Required Textbooks and Software**
Readings will consist of cutting-edge conference/journal papers selected per-semester by the instructor. Student selected papers for presentations and survey paper will be instructor-vetted and uploaded throughout the semester.

**Recommended Materials**
Other reading materials based on student selections.

**Course Schedule – Topic ordering subject to change**
Week 1: (Instructor-delivered) Introduction to the course and blockchain history.
Week 2: (Instructor-delivered) IoT design architecture principles
Week 3: (Instructor-delivered) IoT constrained-device design challenges
Week 4: (Instructor-delivered) Hardware/software co-design principles
Week 5: (Instructor-delivered) IoT data privacy concerns and challenges
Week 6: (Instructor-delivered) IoT device design, Midterm 1
Week 7: (Instructor-delivered) Blockchain usage scenarios and Cryptocurrencies
Week 8: (Instructor-delivered) Blockchain security and Smart contracts
Week 9: (Instructor-delivered) Blockchain security and Smart contracts
Week 10: (Instructor-delivered) DAOs and NFTs
Week 11: (Instructor-delivered) Mining and consensus protocols
Week 12: (Student-delivered) Midterm 2 and student-selected Blockchain and IoT topics
Week 13: (Student-delivered) Student-selected Blockchain and IoT topics
Week 14: (Student-delivered) Student-selected Blockchain and IoT topics
Week 15: Guest Lectures/Semester Review, Roundup, Survey paper presentation
Week 16: Final Exam

Attendance Policy, Class Expectations, and Make-Up Policy
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/

Evaluation of Grades

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<th>Assignment</th>
<th>Total Points</th>
<th>Percentage of Final Grade</th>
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<tr>
<td>Midterm 1</td>
<td>100</td>
<td>10%</td>
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<tr>
<td>Midterm 2</td>
<td>100</td>
<td>10%</td>
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<tr>
<td>Final exam</td>
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<td>10%</td>
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<tr>
<td>Class Participation</td>
<td>100</td>
<td>10%</td>
</tr>
<tr>
<td>Homework assignments</td>
<td>100</td>
<td>15%</td>
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<tr>
<td>Class Presentation(s)</td>
<td>100</td>
<td>20%</td>
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<tr>
<td>Survey paper (4-pages)</td>
<td>100</td>
<td>25%</td>
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Grading Policy
The following is given as an example only.

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<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade Points</th>
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<tbody>
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<td>90.0 - 93.3</td>
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<tr>
<td>86.7 - 89.9</td>
<td>B+</td>
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<tr>
<td>83.4 - 86.6</td>
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<tr>
<td>80.0 - 83.3</td>
<td>B-</td>
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<tr>
<td>76.7 - 79.9</td>
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<td>73.4 - 76.6</td>
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<td>70.0 - 73.3</td>
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<td>0 - 59.9</td>
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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.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/.

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.

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:
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.
• 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.
• If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
• 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.
• Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

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.


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/.

