

## CSCE 4043 RFID INFOSEC (3 credits), Elective

**Catalog Description:** Radio frequency identification (RFID) information systems provide information to users about objects with RFID tags. They require the application of information systems security (INFOSEC) to protect the information from tampering, unauthorized information disclosure, and denial of service to authorized users. This course addresses security and privacy in an RFID system.

**Prerequisites:** INEG3313 or STAT3013

**Textbook/required material:** Daniel M. Dobkin, *The RF in RFID: passive UHF RFID in practice*, Oxford, UK: Elsevier, 2008 or 2nd edition from 2013.

**Goals:** The goal of the class is for students to understand security and privacy issues in radio frequency identification (RFID) systems.

### Topics covered:

- RFID Background: History, Applications, RFID Reference Model, Types of Tags, Shareholders, Hacking, Social Implications, and Privacy
- RFID Security: Confidentiality, Integrity, Availability, Threats, Cryptography, and Risk Assessment
- Tag Layer: Architecture, EPCglobal Gen2 Tag Finite State Machine, Threats, Risks, and Mitigation
- Media Interface Layer: Frequency Bands, Electromagnetics, Antennas, Nominal Read Range, Modulation, Encoding, Data Rates, Fast Fourier Transform, Singulation, Regulations, Threats, Risks, and Mitigation
- Reader Layer: Architecture, Antenna Configurations, Gen2 Sessions, Gen2 Single-, Multiple-, and Dense-Interrogator Operation, Low Level Reader Protocol (LLRP), Middleware, Threats, Risks, and Mitigation
- RFID Standards, Laws, Regulations, Policies, and Guidelines: EPCglobal, ISO/IEC Item Management, Contactless Smart Cards, Animal Identification, FCC Rules for ISM Band, Identity Standards, and Guidelines for Securing RFID Systems

**Class/laboratory schedule:** Meets either 3 times a week for 50 minutes or 2 times a week for 1 hour 15 minutes for 15 weeks.

### Relationship of course to Computer Engineering Program Student Outcomes:

- (a) An ability to apply knowledge of mathematics, science, and engineering.
- (c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- (e) An ability to identify, formulate, and solve engineering problems.
- (f) An understanding of professional and ethical responsibility.

- (h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- (j) A knowledge of contemporary issues.
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Relationship of course to Computer Science Program Student Outcomes:**

- (a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
- (g) An ability to analyze the local and global impact of computing on individuals, organizations and society.
- (i) An ability to use current techniques, skills, and tools necessary for computing practices.
- (j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

**Prepared by:** Dale R. Thompson

**Date:** August 19, 2014

## CSCE 4043, RFID INFOSEC, Elective

Fall 2014 (Aug. 25 - Dec. 19)

Undergraduate: CSCE 4043-001 (ISIS #10524), Graduate : CSC 4043-001 (ISIS #10686)

### General Information

- Class websites: <http://learn.uark.edu> (Blackboard), <http://www.NetGeekDr.com>, and <http://rfidsecurity.uark.edu> (previous years' class website)
- Time/Location: TR, 11:00 a.m. – 12:15 p.m., JBHT 239
- Instructor: Dale R. Thompson, Ph.D., P.E.
  - Office hours: <http://www.NetGeekDr.com/calendar>
  - Office: JBHT 521
  - Phone: 575-5090
  - Email: *drt@uark.edu*

### Grading

Course grades will be determined by these weights:

Homework, Labs, Participation, and Quizzes:	25%
Risk Assessment Project:	25%
Midterm:	25%
Project:	25%

The final class grade will be assigned according to the 10-point scale shown below. The grades may or may not be curved.

A	90 – 100%
B	80 – 89.9%
C	70 – 79.9%
D	60 – 69.9%
F	< 60%

### Homework

All assignments will be given with a strict deadline, and students are required to submit their assignments on or before the deadline. Homework will be collected at the start of the class on the due date, and late submissions will not be accepted. In case of extenuating circumstances, students are advised to contact the professor as soon as practical. You are encouraged to discuss the course and the assignments with each other; however, your exams and homework should be your own work.

### Attendance

Attendance will be taken. Attendance will be used as a deciding factor when the final average is between grades. For example, if you have an average of 89.5 and you have attended a high percentage of the classes it may be rounded up to an "A". If you have an average of 89.5 and you have attended a small percentage of the classes it will probably still be a "B".

### Academic Dishonesty Policy

As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.

Each University of Arkansas student is required to be familiar with and abide by the University's 'Academic Integrity Policy', which may be found at <http://provost.uark.edu/>. Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

## EMERGENCY PROCEDURES

Many types of emergencies can occur on campus; instructions for specific emergencies such as severe weather, active shooter, or fire can be found at [emergency.uark.edu](https://www.uark.edu/emergency).

### **Severe Weather (Tornado Warning):**

- Follow the directions of the instructor or emergency personnel
- Seek shelter in the basement or interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building
- Stay in the center of the room, away from exterior walls, windows, and doors

### **Violence / Active Shooter (CADD):**

- **CALL-** 9-1-1
- **AVOID-** If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY-** Barricade the door with desk, chairs, bookcases or any items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it's safe.
- **DEFEND-** Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

## **Inclement Weather Policy**

My inclement weather policy has three steps, which are listed below.

1. If the UofA is closed, then there will not be class.
  - See <http://www.uark.edu> to determine if the UofA is closed.
2. If the Fayetteville Public Schools are closed *because of the weather*, then there will not be class.
3. If there is bad weather and the U of A and the Fayetteville Public Schools are open, I will do one of the following, or both, to let students know if there is class. CHECK BOTH VOICEMAIL AND E-MAIL BECAUSE E-MAIL IS NOT AS RELIABLE DURING BAD WEATHER.
  - Put a message on my voice mail at 575-5090 stating that class is dismissed.
  - Email the class distribution list stating that class is dismissed.

**If you feel that you cannot safely come to class, then do not come. Use your own judgment.**