

# EE 491 Weekly Report    DEC15-17    Week 2 (1/26/15-2/1/15)

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**Advisors:** Dr. Ravi Hadimani and Neelam Prahbu      **Client:** Iowa State University  
**Members (roles):** Marion Okoth (Team Leader), Elizabeth Clarkin (Website) and Matthew Mulloy (Weekly Reports)  
**Project Title:** Magnetic Sensor Design.

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## Weekly Summary

The main goal this week was to familiarize ourselves with the project objectives and to allocate tasks. We had two meetings one with the advisors and one with the group alone.

## Meeting notes:

### 1/26 Group Meeting

**Duration:** 60 min      **Members Present:** All

- The first team meeting focused on learning more about the project and task allocation.
- Matt volunteered to work on designing and optimizing the magnetic field generation unit.
- Elizabeth will work on the project website, make the software interfaces and work on COMSOL.
- Marion will work on the antenna material design, synthesis and measurement. Also will help Elizabeth with COMSOL software. She will also work on overall sensor measurement.

### 1/30 Group Meeting with Advisors

**Duration:** 60 min      **Members Present:** All

## Purpose and Goals:

Define project deliverables, answer logistical questions, and make sure everyone is on the same page.

## Achievements:

As a group, we defined exactly what was expected of us over the course of the project. The deliverables are shown below:

### Magnetic Field Generation Unit Design

- Optimize the field generation unit to create a uniform magnetic field of 400 Gauss.
- Simulate the geometry using COMSOL.
- Optimizing geometry of the sensing coil.

### Automation of measurement unit

- Importation of measurement data into MATLAB.
- Design a GUI (Graphical User Interface) which will automatically conduct measurements using the User's inputs.

### Identifying and isolating sources of noise in the measurement system

- Designing an appropriate magnetic shielding unit.
- Designing a kind of sample holder such that the sample position within the coil doesn't vary by moving the magnet.

### Antenna Design

- Discover properties of interest for NMR antenna design by measuring existing samples using the Hysteresis Graph.
- Learn how to make the ferrite epoxy sample and sample optimization.

We also received answers to our questions of where, when, and how we would complete our work.

## **Pending issues**

1. Training requirements using software and/or equipment such as COMSOL and the Hysteresis Graph.
2. Questions regarding how to implement the software interface for the measurement apparatus.
3. Type of materials to be considered in the antenna design.

## **Plans for next week**

1. Matt: Will begin design on the magnetic field generation unit.
2. Elizabeth: Will continue working on the website, start on the MATLAB GUI for the software interface with the machine, and will get trained on COMSOL software.
3. Marion: Will get trained on how to make measurements using the Hysteresis graph in addition to researching more ferrite epoxy materials that can be used for the antenna. Also get trained on COMSOL software.

## **Individual Contributions (this week)**

Matthew Mulloy: Attended the meeting, research. (7 hrs.)

Elizabeth Clarkin: Attended the meetings, website design (8.5 hrs.)

Marion Okoth: Attended meetings, research (9 hrs.).

## **Total contributions for the project**

Matthew Mulloy (11 hrs.)

Elizabeth Clarkin (12.5 hrs.)

Marion Okoth (13 hrs.)