

## ECE 403 Senior Project Outline

### 1 Introduction

- 1.1 Provide purpose and description of project
- 1.2 List specifications
- 1.3 Forecast Report

### 2 Breakdown

- 2.1 Power Supply overview
- 2.2 Microprocessor
- 2.3 Temperature Sensor
- 2.4 User I/O
- 2.5 Hot Plate Controls
- 2.6 Alarm Circuitry
- 2.6 Explain the software briefly

### 3 Details

#### 3.1 Hardware

- 3.1.1 Power Supply
  - 3.1.1.1 Bridge Rectifier
  - 3.1.1.2 Buck Converter
- 3.1.2 Microprocessor
- 3.1.3 Temperature Sensor
  - 3.1.3.1 Wheatstone Bridge
  - 3.1.3.2 Instrumentation Amplifier
- 3.1.4 User I/O
  - 3.1.4.1 LEDs
  - 3.1.4.2 LCD
  - 3.1.4.3 Keypad
- 3.1.5 Hotplate Controller
  - 3.1.5.1 Zero-Sensing
  - 3.1.5.2 Triac
- 3.1.6 Alarm Circuitry

#### 3.2 Software

- 3.2.1 PID Controller/Triac signal
- 3.2.2 Temperature conversion
- 3.2.3 Alarm conditions

## 4 Results

4.1 Power Supply

4.2 Temperature Sensor

4.3 Temperature Control

4.3 Triac Current Conditions

## 5 Conclusion

## Appendices

A Project Contract

B Schematics

B.1 Complete Schematic

B.2 Power Supply

B.3 Temperature Sensor

B.4 Controller

C Parts List

D Datasheets

D.1 AtMega

D.2 BT137 Triac

D.3 Adafruit RTD

D.4 MOC3051 optoisolator

D.5 LM2576 simple switcher