

# **EEL4802 - Introduction to Digital Forensics Engineering**

Three Credits, Two and a half hours, Engineering Topic.

**Instructor:** Matt Ruddell

**Textbook:** Introduction of Instructor Source: Ruddell (2019)

## **Specific Course Information:**

This is an undergraduate-level course that provides a foundation for students new to the digital forensics field. The course presents a practical guide to what digital forensics is the methodologies used, key technical concepts, and the tools needed to perform examinations and media exploitation techniques. This course is geared toward people with a solid knowledge of computers, but no programming skills are necessary. The course topics include the fundamentals of forensic science, laws, and regulations relating to digital data, quality assurance and best practices in a digital laboratory, basic terminology an introduction to forensic software, operating and file systems artifacts, and user artifacts.

This course consists of five (5) modules and five (5) hands-on practical lab exercises. Modules must be completed sequentially. All assignments must be completed individually. Labs will be due one week after assignment and will be evaluated within one week of submission. Communication will take place via Canvas email, instructor announcements, and class discussion boards. At the end of the course, you will be able to explain the fundamentals of digital forensic science and demonstrate the ability to apply forensically sound methodologies using the appropriate tool(s). This foundational course is designed to prepare you to further your studies in digital forensics if desired.

## **Specific Goals for the Course**

### **a. Specific outcomes of instruction**

Upon successful completion of this course, the student will:

- 1.Explain and use the scientific method to digital forensics, and why adherence to the scientific method is necessary for evidence to be admissible in court.
- 2.Create forensic images using the correct methodology and tools
- 3.Apply and use tools to recover system artifacts and user-created artifacts.
- 4.Examine unallocated space on a piece of media to recover deleted data.
- 5.Compare data sets using hash values.
- 6.Explain what purpose hash values serve in digital forensics.
- 7.Examine a forensic image and recover artifacts using forensic tools and methodology.

### **b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.**

In this course the student will have to show

- (a) an ability to apply knowledge of mathematics, science, and engineering (N/A)
- (b) an ability to design and conduct experiments (simulations), as well as to analyze, interpret data (N/A)
- (c) an ability to design a system, component, or process to meet desired needs (N/A)
- (d) an ability to function in multi-disciplinary teams (N/A)

- (e) an ability to identify, formulate, and solve engineering problems (homework) (N/A)
- (f) an understanding of professional and ethical responsibility (N/A)
- (g) an ability to communicate effectively (through project reports) (N/A)
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context (N/A)
- (i) a recognition of the need, and an ability to engage in life-long learning (N/A)
- (j) a knowledge of contemporary issues (N/A)
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (N/A)
- (l) a knowledge of probability and statistics (N/A)

**Brief list of the topics to be covered**

1. There will be stive (5) hands on lab assignments in this course
2. The labs will require access to a Windows computer with administrator rights
3. Students will need one USB thumb drive (recommended less than 16GB in size)
4. Labs will be posted at the beginning of the corresponding Module
  - (1) The time frames are generous, manage your time well and plan ahead; you can always turn assignment in early
  - (2) Late Assignments will result in a zero grade All work should be done individually
5. All assignments will be turned in via Canvas
6. Each question in the lab exercise is assigned a certain number of points
- (1) Partial credit will be given at the instructor's discretion
7. Lab Assignments will be graded within seven (7) days of the due date

**GRADING:**

Course Requirements	Weight
Module Quizzes	25%
Lab Assignments	50%
Discussion Posts	25%
Overall Grade	100%

**Conversion of Numerical Grade to Letter Grade**

95<=A<=100	83<=B<86	70<=C<76
90<=A-<94	80<=B-<82	60<=D<69
87<=B+<89	77<=C+<79	F: Below 60