Forensic Authentication of Digital Images

Course Description: Students explore authentication of digital images with regard to evidence admissibility and counterfeit detection. EXIF data analysis, recompression analysis, PRNU, and more will be discussed. Students are strongly encouraged to bring images from their own cases as well as their own digital cameras.

Course Outcomes:

Knowledge
Students will:
- Gain new perspectives to understand:
  - The latest forensic image authentication techniques.
  - Advanced principles of forensic image authentication.
  - Forensic techniques, emerging science, and limitations of the forensic expert.
  - Digital evidence seizure and acquisition.
- Acquire knowledge which either enhances or is not covered in scientific literature.

Skills
Students will:
- Take entrance and exit exams to gauge course’s effectiveness while informing student regarding the advancement of their knowledge.
- Understand the questions that they shall be able to answer as a forensic expert.
- Know how to manipulate digital evidence.
- Know how to apply advanced techniques for forensic image authentication.
- Demonstrate a familiarity with general topics related to forensic imaging.

Dispositions
Students will:
- Gain an appreciation for advanced issues in forensic imaging.
- Be able to critically evaluate different forensic video equipment, software, and methods.
- Enhance awareness of needs and opportunities in the field of digital imaging.

Course Schedule:
1. Foundations for Forensic Image Authentication
   1.1. Digital Photo and Recording Techniques
   1.2. RAW Images
   1.3. Lossy Compression Algorithms
2. Demonstration and Practice
   2.1. Digital Evidence Seizure and Acquisition
   2.2. Forensic Image Authentication
2.2.1. Compression Level Analysis
2.2.2. Color Filter Array
2.2.3. DCT Analysis
2.2.4. Error Level Analysis
2.2.5. Bi-Dimensional FFT
2.2.6. PRNU Analysis, etc.