

George Mason University
CFRS 762 – Mobile Device Forensics
CRN 77355, Sec 001
Fall 2012, August 31-December 14, F 6:00-8:45PM
ENGR 4457

Instructor

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Office Hours: Available upon request

Description

This course will familiarize students with mobile devices and technology used by carriers. Students will identify data that can be retrieved from mobile devices, such as cell phones, smart phones, and GPS devices. Recovered and analyzed data will include address books, call logs, text messages, video files, audio files, and Internet history. Students will correlate data with records from Network Service Providers, e.g., call phone service carriers. Students will apply industry best practices to evidence collection and analysis with hands-on exercises using current tools.

Learning Objectives

Upon completing the course, students will be able to:

- Produce a forensic report that includes the steps in the collection, handling, and preservation of digital evidence from mobile devices, such as cell phones.
- Construct a forensic acquisition plan for mobile devices that will account for various scenarios and the limitations of cell phone technology.
- Validate data obtained from the forensic acquisition of mobile devices with current tools.
- Analyze data retrieved from mobile devices with current tools.
- Assess the differences between cellular network architectures and identify their impact on forensic data.
- Analyze data provided from network service providers and cross-reference the results with data obtained from mobile devices.

Required Materials

Students are to bring the following materials to class:

- At least one USB flash drive
- Laptops with VMware, VM Fusion, or VMplayer

The following texts will be used for the class.

Casey, E. (ed.) (2010). *Handbook of Digital Forensics and Investigations*. Elsevier Academic Press. Burlington, MA.

Jansen, W. and Ayers, R. (2007, May). "Guidelines on Cell Phone Forensics: Recommendations of the National Institute of Standards and Technology." Special Publication 800-101. National Institute of Standards and Technology. Gaithersburg, MD. <http://csrc.nist.gov/publications/nistpubs/800-101/SP800-101.pdf>

Jansen, W. and Delaitre, A. (2009, October). "Mobile Forensic Reference Materials: A Methodology and Reification." National Institute of Standards and Technology Interagency Report (NISTIR) 7617. National Institute of Standards and Technology. Gaithersburg, MD. <http://csrc.nist.gov/publications/nistir/ir7617/nistir-7617.pdf>

Jansen, W., Delaitre, A., and Moenner, L. (2008, January). "Overcoming Impediments to Cell Phone Forensics." National Institute of Standards and Technology. Gaithersburg, MD. http://csrc.nist.gov/groups/SNS/mobile_security/documents/mobile_forensics/Impediments-formatted-final-post.pdf

Graded Material

Each assignment, quiz, project, and exam will be graded on a 0-100 point scale.

The final average is calculated by the following weights.

Assignments.....	20%
Quizzes	20%
Midterm	25%
Hands-on Exercises	15%
Final Exam	20%
 Total	 100%

The following criteria will be used for the assignment of letter grades

A	92-100
A-	90-91
B+	87-89
B	83-86
B-	80-82
C	70-79
F	0-69

The course will adhere to the university's policies on grading.

Assignment Due Dates

All assignments are to be submitted by the due dates listed in the syllabus. Work will not be accepted late. Assignments are to be submitted via Blackboard.

Class Attendance

Attendance is mandatory. A number of classes will involve the hands-on use of forensics tools, which will be used in the classroom. In the event that a student cannot attend class due to an emergency or crisis, the student is to contact the instructor as soon as possible.

Responsible Use of Computing Policy

Use of computer equipment, including Internet connections within the classroom will be conducted in accordance with the University's Responsible Use of Computing (RUC) Policy. This applies to all academic and operational departments and offices at all university locations owned or leased. The policies and procedures provided herein apply to all Mason faculty, staff, students, visitors, and contractors.

The university provides and maintains general computing services, including web and Internet resources, and telecommunication technology to support the education, research, and work of its faculty, staff, and students. At the same time, Mason wishes to protect all users' rights to an open exchange of ideas and information. This policy sets forth the responsibilities of each member of the Mason community in preserving the security, confidentiality, availability, and integrity of Mason computing resources. To accomplish these ends, this policy supports investigations of complaints involving Mason computing abuse, including sexual harassment, honor code, federal, state, applicable industry, and local law violations.

University faculty and staff members, as state employees, are subject to the Freedom of Information Act, §2.2-3700, et seq., of the Code of Virginia, and all applicable state and federal rules and regulations. While this policy endeavors to maintain user confidentiality, it cannot create, nor should faculty or staff members presume, any expectation of privacy.

Violations of this policy may result in revocation of access, suspension of accounts, disciplinary action, or prosecution. Evidence of illegal activity will be turned over to the appropriate authorities. It is the responsibility of all users of Mason computing resources to read and follow this policy and all applicable laws and procedures (user sign-on agreement).

For more information regarding the RUC Policy, consult the student handbook.

Important Dates

Last day to drop with no tuition penalty	September 4
Last day to drop with a 33% tuition penalty	September 18
Last day to drop with a 67% tuition penalty	September 28
Thanksgiving Break	November 21-25
Final Exams	December 11-19

Course Outline

The following is the course outline. It is subject to revision.

Week 1 Introduction to Cell phone forensics

8/31

Reading assignment Casey, E. (2010). "Chapter 10: Mobile Network Investigations." *Handbook of Digital Forensics and Investigations*. pp. 537-542.

Classroom material Introduction.pptx

"The Growth of Mobile: Stats and figures that will shock you!"
<http://www.youtube.com/watch?v=0aUQLIPdtg8>

Week 2 Mobile Device Usage and Data Artifacts

9/7

Reading assignment Jansen, W. and Ayers, R. (2007). Guidelines on Cell Phone Forensics. Appendix C. pp. 82-92.

Casey, E. (2010). "Chapter 10: Mobile Network Investigations." *Handbook of Digital Forensics and Investigations*. pp. 529-532.

Classroom material Usage_and_Data.pptx

Assignments Assignment #1 – Current Events
 Due on September 7 by 5:45PM

Assignment #2 – Current Mobile Device Forensics
 Due on September 7 by 5:45PM

Week 3 Carrier Technologies

9/14

Reading assignment Jansen, W. and Ayers, R. (2007). Guidelines on Cell Phone Forensics. Section 2.1. pp. 6-8.

ETSI. "Mobile technologies GSM."
<http://www.webcitation.org/5yRQjyd8W>

ETSI. "Cellular History"
<http://www.etsi.org/WebSite/Technologies/Cellularhistory.aspx>

TelecomSpace. "CDMA"
<http://www.telecomspace.com/cdma.html>

Classroom material Carriers.pptx

Assignment Assignment #3 – Data Contained on Mobile Devices
 Due on September 14 by 5:45PM

	Quiz	Quiz 1 (Material from weeks 1 and 2)
Week 4 9/21	Network Service Provider Infrastructure	
	Reading assignment	Casey, E. (2010). "Chapter 10: Mobile Network Investigations." <i>Handbook of Digital Forensics and Investigations</i> . pp. 517-526.
	Classroom material	Infrastructure.pptx
	Assignment	Assignment #4 – Carrier Technology Due on September 21 by 5:45PM
Week 5 9/28	Procedures	
	Reading assignment	Jansen, W. and Ayers, R. (2007). Guidelines on Cell Phone Forensics. Sections 3 – 7.2. pp. 13-61. Ayers, R., Wayne, J., Cilleros, N., and Daniellou, R. (2005). Cell Phone Forensic Tools: An Overview and Analysis. p. 5.
	Classroom material	Procedures.pptx Cellebrite Demonstration http://www.youtube.com/watch?v=kET-F_3xuD8 SIM Card Seizure Demonstration http://www.youtube.com/watch?v=fMPUCrvuo Hands-on demonstrations with phones and tools Paraben Device Seizure Instructions
	Assignment	Assignment #5 – Infrastructure Due on September 28 by 5:45PM
	Quiz	Quiz 2 (Material from weeks 3 and 4)
Week 6 10/5	Impediments to Cell Phone Forensics	
	Reading assignment	Jansen, W., Delaitre, A., and Moenner, L. (2008). "Overcoming Impediments to Cell Phone Forensics." Proceedings of the 41 st Hawaii International Conference on System Sciences. National Institute of Standards and Technology. http://www.forensicswiki.org/images/9/9c/JensenCellPhones.pdf
	Classroom material	Impediments.pptx

	Assignment	Assignment #6 – Procedures Due on October 5 by 5:45PM
Week 7 10/12	Mid-term	
Week 8 10/19	Comparison and Contrast of Current Industry Toolsets	
	Reading assignment	Ayers, R., Jansen, W., Moenner, L., and Delaitre, A. (2007). Cell Phone Forensic Tools: An Overview and Analysis Update. NISTIR 7387.
	Classroom material	Forensic_Tools.pptx Hands-on Exercises/Acquisitions to be conducted
	Assignment	Assignment #7 –Recommendations Due on October 19 by 5:45PM
Week 9 10/26	Acquisition I	
	Reading assignment	
	Classroom material	UFED_Acquisition.pptx DS_Acquisition.pptx BitPim_Acquisition.pptx Hands-on Exercises/Acquisitions to be conducted
	Assignment	Assignment # 8 – Forensic Tools Recommendations Due on October 26 by 5:45PM
Week 10 11/2	Acquisition II	
	Reading assignment	Jansen, W. and Ayers, R. (2007). Guidelines on Cell Phone Forensics. Section 2.3. pp. 11-12.
	Classroom material	Kindle.pptx SIM Acquisition.pptx TomTom-GPS.pptx “Bourne SIM clone” http://www.youtube.com/watch?v=3_eYMfggkq0

“Paraben’s SIM Card Seizure software demo”
<http://www.youtube.com/watch?v=fFMPUCPrvu0>

Hands-on Exercises/Acquisitions to be conducted

Quiz Quiz 3 (Material from weeks 8 and 9)

Week 11 Legal Interception of Data

11/9

Reading assignment Casey, E. (2010). “Chapter 10: Mobile Network Investigations.”
Handbook of Digital Forensics and Investigations. pp. 542-556.

Classroom material Legal_Interception.pptx

Hands-on Exercises/Acquisitions to be conducted

Week 12 Call Detail Records (CDRs) and other Data from Network Service Providers

11/16

Reading assignment Jansen, W. and Ayers, R. (2007). Guidelines on Cell Phone Forensics.
 Sections 7.3. pp. 61-64.

Casey, E. (2010). “Chapter 10: Mobile Network Investigations.”
Handbook of Digital Forensics and Investigations. pp. 527-528.

Classroom material NSP-data.pptx

Tower_Info.pptx

Geolocating.pptx

Hands-on Exercises/Acquisitions to be conducted

Assignment Assignment #9 – FISA
 Due November 16 by 5:45PM

Quiz Quiz 4 (Material from weeks 10 and 11)

Thanksgiving Break

11/23

Week 13 Interpreting Recovered Data

11/30

Reading assignment Casey, E. (2010). “Chapter 10: Mobile Network Investigations.”
Handbook of Digital Forensics and Investigations. pp. 517-526.

Classroom material Mapped_CDR.pptx

Hands-on Exercises/Acquisitions to be conducted

	Assignment	Assignment #10 – Cell Tower Assignment (.pptx) Due on November 30 by 5:45PM
Week 14 12/7	Mobile Malware	
	Reading assignment	Android Developers. (2011, June 7). "Security Permissions." http://developer.android.com/guide/topics/security/security.html (Anonymous). (2011, March 20). "Breaking out of Android Sandbox." http://pfalcon-oe.blogspot.com/2011/03/breaking-out-of-android-sandbox.html McMillan, R. (2011, January 17). "Coming Soon: A New Way to Hack into Your Smartphone." http://www.pcworld.com/businesscenter/article/216842/coming_soon_a_new_way_to_hack_into_your_smartphone.html Morgan, B. (2002, November 15). "J2ME Security: Now and in the Future." http://www.informit.com/articles/article.aspx?p=30029 Knudsen, J. (2003, February). "Understanding MIDP 2.0's Security Architecture." http://developers.sun.com/mobility/midp/articles/permissions/
	Classroom material	Malware on Exploits.pptx Malware on Mobile Platforms.pptx
	Assignment	Assignment #11 Due on December 7 by 5:45PM
	Quiz	Quiz 5 (Material from weeks 12 and 13)
Week 15 12/14	Final Exam	