ASM Educational Center (ASM) Est. 1992

11200 Rockville Pike, Suite 220 Rockville, MD 20852 | Phone: 301-984-7400 | Fax: 301-984-7401
Web: www.asmed.com | E-mail: info@asmed.com

LIVE Digital Forensics
(Customized Course)

DAY ONE START

I. Introduction to Forensics

- Computer Forensics defines
- Traditional forensics
- "Live" system forensics
- Establishing a Forensic Methodology
    - Repeatable process

LAB ONE : Forensic Analysis: What were up against

II. Legal aspects of a Forensic Investigation

- Computer crime law
    - 1029 and 1030
    - RIPA
    - UAE: Cybercrime law No. 2
    - Others
- Investigating the scene
    - Preservation of evidence
    - Maintaining the chain of custody

III. Planning a Response to a potential incident

- Search and seizure laws
- What can and cannot you take
- Laws of digital evidence
    - Hearsay
        - Exceptions to the hearsay law
- Digital evidence references
    - International Journal of Digital Evidence
    - Chief Police Officers Guide
- Interviewing techniques
    - Characteristics of deception
- Incident response life-cycle

IV. Defeating Hacker hiding techniques

- Unallocated space
- File fragmentation
- Obfuscating strings

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LAB TWO: String Searching for information

- Attributes
- File signatures
- File segmentation
- File combining

LAB THREE: File Hiding and Combining

- File binding and wrappers

LAB FOUR: File Wrappers

- Alternate data streams

LAB FIVE: Alternate Data Streams

- Registry
- Object linking and embedding (OLE)
- Office documents
- File manipulations
    - Extensions
    - Headers

LAB SIX: File manipulation

DAY ONE LAB: Forensic Challenge

DAY TWO START

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V. Application of Steganography to defeat forensic examinations

- Defining
- History
- Types
- Steganography vs Watermarking
- Steganalysis
- Detecting Steg
- Future of Steganography

LAB SEVEN: Steganography

VI. Capturing traffic on the "wire" and Implementing Network Forensics

- TCP/IP fundamentals
- TCP/IP internals
- Layer by layer forensics
- Collecting data
    - Raw protocol analysis
        - Tcpdump
        - Windump
    - Full protocol analysis
        - Wireshark
            - Working with filters
            - Session re-assembly

LAB EIGHT: TCP/IP analysis

VII. Intrusion Analysis of Network Traffic on Windows and Linux

- Identifying normal vs abnormal traffic
- Determining cause of abnormal traffic
    - Error
    - Malicious
- Recognizing common patterns of network attacks
- Identifying the OS from the network traffic
    - Passive fingerprinting characteristics
        - Nuances of the TCP/IP stack

LAB NINE: Analyzing basic attacks

- Components of a sophisticated attack
    - Deception techniques
    - Protocol camouflage
    - Encryption and tunnels

LAB TEN: Analyzing a sophisticated attack

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- Components of advanced attacks
  - Protocol encapsulation
    - More than one layer 7
  - Web attacks
    - Services
    - SQL
    - XSS
    - Access controls

LAB ELEVEN: Analysis of Web Attacks

DAY TWO LAB: Forensic Challenge Two

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DAY THREE START

VIII. Email Forensics: Investigating Email to trace a path to the perpetrator

- Client side investigations
- Server side investigations
- Analyzing headers
- Validating the path
- Recovering deleted emails
- Recovering email attachments
- Forensic analysis of online email systems

LAB TWELVE: Email Forensics

IX. Web Activity Forensics: Reconstruction of Internet traffic after deliberate deletion

- Reconstructing browsing activity
- Analyzing cookies
- Examining temporary files and storage locations
- Registry artifacts
- Reconstructing cleared histories and private data
    - Index.dat
    - History.dat

LAB THIRTEEN: Web Forensics

X. Applying Internet Forensics to catch the crafty hackers

- Understanding DNS
- Records of interest
- Analyzing DNS activity at the packet level
- Authoritative vs non-authoritative

XI. Recovering Protected Storage information to identify illicit activity

- Locating stored data
    - Pass View
- Formats of storage
- Auto completion
- Registry data
- Recovering protected storage data in IE 7
    - Pass View 1.7

XII. Encryption and password hashing primer

- Encryption techniques
    - Algorithms

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- Stream
- Block
- Identifying

LAB FOURTEEN: Identifying algorithms

- Cracking
  - Fallacy of
  - Definition of a "cryptographic" crack
- Hashing
  - Algorithms
    - UNIX/Linux
    - Windows
      - LM
      - NTLM
      - NTLMv2
  - Cracking
    - Dictionary
    - Hybrid
    - Brute force
    - Rainbow

LAB FIFTEEN: Password Cracking

XIII. Introduction to "LIVE" Forensics

- Volatile data
- Non-volatile data
- Process and memory analysis

LAB SIXTEEN: Capturing Volatile Information

DAY THREE LAB: Forensic Challenge Three

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DAY FOUR START

XIV. Understanding Unix/Linux "LIVE" Forensics to recover memory based evidence

- Analyzing volatile data
  - Network connections
  - Ports
  - Processes
  - Memory of processes
  - Open files and handles
  - Routing tables
  - Kernel modules
  - Mounts
- Analyzing non-volatile data
  - System version
  - Time and date stamps
  - Logs
  - History files
- Rootkits

LAB SEVENTEEN: Linux "LIVE"

XV. Processing Windows "LIVE" Forensics information to discover malware

- Analyzing volatile data
  - Network connections
  - Ports
  - Processes
  - Memory of processes
  - Open files and handles
  - Routing tables
  - System memory
- Analyzing non-volatile data
  - System version
  - Time and date stamp
  - Registry data
  - Login history
  - Auditing policy
  - Examining the event viewer
  - Logs and using logparser
    - Using logparser
    - Developing powerful queries
      - Basic
      - Advanced

LAB EIGHTEEN: Windows "LIVE"

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XVI. Advanced Windows Forensics: Performing low-level internal analysis to identify advanced memory corruptions

- Windows internals
  - System architecture
  - Memory management
  - Cache management
  - Dumps analysis
  - Tools
    - Filemon
    - Regmon
    - Process explorer
    - Process explode
    - Dependency walker
- Win32 rootkits
  - Traditional
    - Trojaned files and processes
  - Hooking
    - Man in the middle attack against the descriptor table
  - DKOM
    - Unlinking processes direct in memory

LAB NINETEEN: Windows Rootkits

DAY FOUR LAB: Forensic Challenge Four