Training Course on Space Systems and Satellite Network Forensics

Professional Development Training Course Outline

Category	Digital Forensics	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The escalating reliance on **space systems** and **satellite networks** for global communication, navigation, Earth observation, and critical infrastructure has ushered in a new era of cyber vulnerabilities. As our orbital assets become increasingly interconnected and sophisticated, so too do the threats they face from state-sponsored actors, cybercriminals, and malicious entities. This necessitates a specialized and cutting-edge understanding of **space forensics**, a critical discipline focused on investigating incidents, breaches, and anomalies within these complex, high-stakes environments. This training course delves into the unique challenges of digital forensics in the **space domain**, equipping professionals with the advanced knowledge and practical skills to **detect, analyze, respond, and mitigate** cyber threats targeting satellites, ground stations, and their intricate communication links.

Training Course on Space Systems and Satellite Network Forensics will empower participants to navigate the complexities of **orbital cybersecurity**, from understanding satellite architectures and communication protocols to mastering advanced forensic methodologies. We will explore the latest **threat intelligence**, **vulnerability assessment** techniques, and **incident response** strategies specifically tailored for space assets. Through a blend of theoretical foundations and **hands-on labs** with **real-world case studies**, attendees will gain proficiency in collecting, preserving, and analyzing digital evidence from diverse space systems, ensuring the integrity and resilience of our invaluable orbital infrastructure. This training is essential for professionals seeking to become **space cyber defenders** and contribute to the **secure operation** of the rapidly expanding space economy.

Programme Curriculum

Training Course on Space Systems and Satellite Network Forensics

Introduction

The escalating reliance on **space systems** and **satellite networks** for global communication, navigation, Earth observation, and critical infrastructure has ushered in a new era of cyber vulnerabilities. As our orbital assets become increasingly interconnected and sophisticated, so too do the threats they face from state-sponsored actors, cybercriminals, and malicious entities. This necessitates a specialized and cutting-edge understanding of **space forensics**, a critical discipline focused on investigating incidents, breaches, and anomalies within these complex, high-stakes environments. This training course delves into the unique challenges of digital forensics in the **space domain**, equipping professionals with the advanced knowledge and practical skills to **detect, analyze, respond, and mitigate** cyber threats targeting satellites, ground stations, and their intricate communication links.

Training Course on Space Systems and Satellite Network Forensics will empower participants to navigate the complexities of **orbital cybersecurity**, from understanding satellite architectures and communication protocols to mastering advanced forensic methodologies. We will explore the latest **threat intelligence**, **vulnerability assessment** techniques, and **incident response** strategies specifically tailored for space assets. Through a blend of theoretical foundations and **hands-on labs** with **real-world case studies**, attendees will gain proficiency in collecting, preserving, and analyzing digital evidence from diverse space systems, ensuring the integrity and resilience of our invaluable orbital infrastructure. This training is essential for professionals seeking to become **space cyber defenders** and contribute to the **secure operation** of the rapidly expanding space economy.

Course Duration

5 days

Course Objectives

1. Comprehend the foundational principles and unique challenges of cybersecurity in the space domain, including **orbital mechanics** and **satellite communication security**.
2. Understand the intricate components and vulnerabilities of modern **satellite constellations**, **ground segment infrastructure**, and **inter-satellite links**.
3. Develop robust **incident response plans** and procedures tailored for **spacecraft anomalies**, **satellite breaches**, and **orbital cyberattacks**.
4. Apply advanced **digital forensic methodologies** for evidence collection, preservation, and analysis in **zero-gravity environments** and remote space systems.
5. Gain expertise in detecting and analyzing **signal jamming**, **spoofing**, and **data exfiltration** within satellite communication networks.
6. Perform comprehensive **vulnerability assessments** and **penetration testing** techniques on satellite hardware, software, and ground control systems.
7. Become proficient in specialized **forensic software** and hardware tools adapted for **space asset forensics** and **telemetry analysis**.
8. Navigate the complex **legal frameworks**, **international treaties**, and **regulatory compliance** relevant to space incidents and investigations.
9. Cultivate skills in gathering, analyzing, and disseminating **space threat intelligence** to anticipate and counter emerging cyber threats.
10. Identify and analyze **space-borne malware**, **firmware vulnerabilities**, and **supply chain attacks** targeting satellites.
11. Conduct thorough **root cause analysis** and generate detailed **forensic reports** for space incidents to prevent future occurrences.
12. Contribute to the design and implementation of **cyber-resilient space systems** through secure by design principles and **next-generation security protocols**.

13. Engage in simulated **space cyberattack scenarios** and **tabletop exercises** to hone practical incident response and forensic skills.

Organizational Benefits

- Proactively protect critical space assets and sensitive data from escalating cyber threats, ensuring **national security** and **economic stability**.
- Minimize service disruptions and financial losses by swiftly detecting, responding to, and recovering from **satellite cyber incidents**.
- Ensure adherence to international space law and emerging cybersecurity regulations, mitigating legal and reputational risks.
- Develop a highly skilled workforce capable of conducting effective and efficient **space incident investigations**.
- Safeguard proprietary satellite designs, communication protocols, and sensitive mission data from **espionage** and theft.
- Mitigate risks associated with vulnerabilities in the satellite supply chain, from manufacturing to deployment.
- Foster a competitive edge by demonstrating robust **cyber resilience** and trustworthiness in the rapidly expanding space economy.
- Implement comprehensive risk assessment and mitigation strategies specifically tailored to the unique challenges of the **space domain**.

Target Audience

1. Aerospace Engineers and Satellite System Designers
2. Cybersecurity Analysts
3. Digital Forensics Investigators
4. Military and Defense Personnel
5. Government Agency Professionals
6. Telecommunications Engineers
7. Researchers and Academics
8. IT Security Managers

Course Outline

Module 1: Introduction to Space Systems and Cybersecurity Fundamentals

- Overview of the **Space Ecosystem**
- Understanding the Unique Cyber Threat Landscape for Space Assets
- Introduction to Digital Forensics Principles Adapted for Space
- Legal and Ethical Considerations in Space Forensics
- **Case Study:** Analysis of a historical satellite anomaly potentially caused by cyber interference.

Module 2: Satellite Architecture and Network Vulnerabilities

- Detailed Examination of Satellite Subsystems**.**
- Ground Segment Infrastructure and its Attack Surfaces
- Satellite Communication Protocols and Their Security Weaknesses**.**
- Vulnerabilities in the Space Supply Chain
- **Case Study:** Investigating a simulated data exfiltration attempt from a ground station network controlling a LEO constellation.

Module 3: Space Incident Response and Preparedness

- Developing a **Space Incident Response Plan (SIRP)**
- Real-time Monitoring of Space Systems for Anomalies
- Coordination and Communication in Space Incidents
- Containment Strategies for Orbital Cyber Incidents
- **Case Study:** Simulating a **GPS spoofing attack** on a commercial navigation satellite and developing an incident response timeline.

Module 4: Digital Forensics Techniques for Space Assets

- **Remote Data Acquisition** from Satellites
- **Memory Forensics** and Firmware Analysis for On-board Systems
- **Network Packet Analysis** in Satellite Communications
- **Log Analysis** from Ground Control Systems
- **Case Study:** Forensic examination of compromised satellite firmware to identify the embedded malware and its propagation mechanism.

Module 5: Advanced Forensic Tools and Methodologies

- Utilizing Open-Source and Commercial Forensic Tools for Space Data
- **Cloud Forensics** in Space Operations
- **Big Data Analytics** for Space Forensics
- **Artificial Intelligence (AI) and Machine Learning (ML)** in Space Forensics
- **Case Study:** Applying AI-driven anomaly detection to identify a subtle, long-term data manipulation within a satellite's Earth observation payload.

Module 6: Threat Intelligence and Adversary Tactics in Space

- Understanding **Advanced Persistent Threats (APTs)** targeting space systems.
- Techniques for **Cyber Espionage** and **Intellectual Property Theft** in the Space Sector.
- Analysis of **Anti-Satellite (ASAT) Capabilities** and their Cyber Component.
- Developing **Proactive Threat Hunting** Strategies for Space Systems.
- **Case Study:** Deconstructing a fictional nation-state sponsored attack scenario aimed at disrupting a satellite's communication capabilities.

Module 7: Legal, Policy, and Regulatory Frameworks

- In-depth Review of **International Space Law** and its Implications for Cyber Incidents.
- National Policies and Regulations Governing Space Security
- **Data Sovereignty** and Cross-Jurisdictional Challenges in Space Forensics.
- The Role of **Cyber Insurance** and Risk Management in the Space Industry.
- **Case Study:** Analyzing the legal implications and international response to a hypothetical cyberattack causing significant orbital debris.

Module 8: Future Trends and Emerging Technologies in Space Forensics

- **Quantum Cryptography** and its Impact on Secure Space Communications.
- **Blockchain for Space Security**.
- **In-Orbit Servicing and Manufacturing (IOSM)** Forensics: Investigating incidents on active orbital platforms.
- **Lunar and Martian Missions Forensics**

- **Case Study:** Discussing the forensic challenges and potential solutions for a future incident involving a deep-space probe.

Training Methodology

This course employs a dynamic and interactive training methodology designed for maximum knowledge retention and practical skill development.

- **Instructor-Led Sessions:** Expert-led lectures and discussions covering theoretical concepts and industry best practices.
- **Hands-on Labs:** Practical exercises and simulations using specialized forensic tools and real-world data samples (where permissible).
- **Case Studies and Scenario-Based Learning:** In-depth analysis of fictional and historical space incidents to develop critical thinking and problem-solving skills.
- **Group Discussions and Collaborative Exercises:** Fostering peer-to-peer learning and knowledge sharing.
- **Interactive Quizzes and Assessments:** Reinforcing learning and evaluating comprehension.
- **Guest Speakers:** Industry leaders and experts sharing their experiences and insights.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com