

Computer Forensics

Academic Year: (2022 / 2023)

Review date: 20-06-2022

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: CAMARA NUÑEZ, MARIA CARMEN

Type: Electives ECTS Credits : 3.0

Year : 4 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

1. Programming.
2. Techniques of information hiding.
3. Information security management.
4. Forensic Science II.
5. Vulnerabilities, threats and computer security protocols.

OBJECTIVES

- Identify security objectives and vulnerabilities, threats and risks of a given information system in a defined operational environment.
- Evaluate the security services to be implemented in a given system and design and implement mechanisms and subsequent protocols.
- Evaluate and implement appropriate authentication mechanisms to access a specific system.
- Use the signature and certification systems in a particular environment.
- Design a security plan, developing the various parts of it, assessing their compliance over time and correcting deviations. Analyze and manage the risks of a particular installation.
- Develop a comprehensive recovery plan for an actual installation. Conduct a compliance audit of files and systems containing personal data.
- Use the tools that allow control of operating systems, mainly Windows and Linux.
- Manage the main techniques of collection, identification and analysis of events, guaranteeing the assurance testing and preserving the chain of custody of them. Assess and manage systems secure erase and data recovery.
- Implement databases over a transmission system. Assess and use different techniques to integrate data mining: extraction techniques and modeling analysis.

The course covers forensics tools, methods, and procedures used for investigation of computer crime, techniques of data recovery, protection and gathering of evidences, and expert witness skills.

Upon successful completion of this course, the student will be able to:

1. Know and use the methodology commonly used in computer forensics investigations.
2. Know and use methods for evidence gathering.
3. Use and evaluate various techniques for evidence analysis in file systems, memory and networks.
4. Install, configure and use forensics tools.
5. Get acquainted with hardware devices used in computer forensics investigations.
6. Retrieve, manipulate and organize evidences systematically.
7. Write forensics reports.
8. Know and use standards and legal regulations linked with computer forensics investigations.

DESCRIPTION OF CONTENTS: PROGRAMME

Module 1

- a. Introduction.
- b. Key technical concepts.

Module 2

- a. Labs and Tools.
- b. Evidence collection and archiving.
- c. Forensic Report.

Module 3

- a. Anti-forensics tools and techniques.
- b. Steganography and covert channels.

Module 4.

- a. Internet and email.
- b. Logs (local and network).
- c. Network forensics.
- d. Cloud forensics.

LEARNING ACTIVITIES AND METHODOLOGY

Lectures, where the main theoretical concepts of the subject will be described and explained. The students will be able to follow these lectures using the appropriate course material as well as the corresponding intranet tools and bibliography. References will help the students to further elaborate on any topic of their interest.

Lab sessions in computer labs where the students will work with forensics tools. Real forensics cases will be introduced and the students will have to solve several exercises that will help them to strengthen their theoretical knowledge and get acquainted with forensics tools.

ASSESSMENT SYSTEM

The evaluation system includes the continuous evaluation of the student's work (evaluation tests of skills and theoretical-practical knowledge and laboratory practice reports) and the final evaluation through a written exam in which the knowledge, skills and abilities acquired throughout the course will be evaluated globally. The evaluation of the course will be carried out according to the following criteria:

1. Final written exam of theory and problems: 60% of the final grade. In order to pass the course the student must obtain a minimum of 4 points out of 10 in this examination.
2. Continuous evaluation grade (practicals and seminars): 40% of the final grade.

In the extraordinary call, the student will choose between:

- (a) A final written exam worth 100% of the grade, consisting of theory, problems and knowledge acquired in the laboratory sessions and seminars; or.
- b) A final written exam for 60% of the grade, consisting of theory and problems. The remaining 40% will come from the grade obtained during the course in the continuous evaluation exam.

% end-of-term-examination:	60
% of continuous assessment (assignments, laboratory, practicals...):	40

BASIC BIBLIOGRAPHY

- Brian Carrier File System Forensic Analysis., Addison-Wesley Professional.
- Cory Altheide and Harlan Carvey Digital Forensics with Open Source Tools, Syngress Media.
- John Sammons The Basics of Digital Forensics. , Syngress.
- Nelson et al. Guide To Computer Forensics and Investigations, Cengage Learning.

ADDITIONAL BIBLIOGRAPHY

- Eoghan Casey Handbook of Digital Forensics and Investigation, Academic Press Inc.
- Harlan Cavey Windows Registry Forensics: Advanced Digital Forensic Analysis of the Windows Registry, Syngress Media.