

## TÓPICOS AVANÇADOS DE SEGURANÇA INFORMÁTICA

Master in Engenharia Informática

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Code: 22700

Main Scientific Area: Computer Architecture, Distributed Systems and Cybersecurity

Lecturer: Paulo Adriano Marques Sousa Teixeira

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 30h Total Workload: 130h

ECTS: 6,0

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### **Objectives**

- Advocate the importance of application security within an organization;
- Identify and describe the main security vulnerabilities affecting information systems;
- Prepare students to design and maintain a safety plan

### **Learning Outcomes**

Students who finish this course unit should be able to:

- Describe concepts related to information security;
- Identify the main fundamental questions on information security;
- Implement, keep and follow and security plan;
- Know and apply mitigation strategies on application security vulnerabilities;
- Identify the security principles in the development of web and mobile applications;
- Know security risks affecting Cloud-based architectures and their mitigation strategies;
- Know tools and techniques for auditing the security of applications.
- Draw and implement application based on secure web services;

### **Course Contents**

#### 1. Information Systems Security

Classify organization resources Security event. Security incident Security characteristics. Menaces to information systems Attacks. Counter-measures.

2. Security Norm ISO 27000. Security Policy. Risk Analysis. Auditing the security of information systems.
3. Vulnerabilities, identification, and mitigation. OWASP top 10. CWE - the vulnerability catalog. Techniques for vulnerability mitigation - Sanitation of inputs and outputs -White and Black-lists -Data encryption/codification Tools and Techniques for security auditing - SAST, DAST e IAST.
4. Security of web and mobile applications. Computation architecture on Web and Mobile devices. Security principles on Web Programming. Authentication and session management. Security on data storage.
5. Security on Cloud Computing. Computation architecture of cloud applications. Main risks and mitigations. Data protection in the cloud. Cloud security as a service Security of Web Services.

### **Recommended Bibliography**

William Stallings, Lawrie Brown; Computer Security: Principles and Practice, 3rd

Edition, Pearson, 2015. Url:

<https://www.pearsonhighered.com/program/Stallings-Computer-Security-Principles-and-Practice-3rd-Edition/PGM153489.html>

Paulo J. Sousa e Miguel P. Correia, Segurança no Software, FCA, 2010 url:

<https://www.wook.pt/livro/seguranca-no-software-paulo-jorge-sousa/9621169>

### **Learning and Teaching Methods**

The student throughout the course should acquire knowledge in the area of security in order to be able to guarantee the confidentiality, availability and integrity of information in organizations using the application of a set of procedures, techniques and safety tools.

Today, information is vital to the success of organizations, threats and risks are more complex and always present, making it fundamental for students, through the skills acquired autonomously and, in the classroom, to be able to design technological solutions that ensure business continuity. Students should gather skills for exploring systems in order to identify vulnerabilities and develop solutions to those vulnerabilities.

### **Assessment Methods**

The student's performance in the discipline will be evaluated through:

A theoretical component consisting of an assessment period, to be carried out during the academic semester, the date of which will be communicated in class at least three weeks in advance. This theoretical component will correspond to a weighting of 30% in the final grade.

Two practical components. The first in the form of a project report to be developed throughout the classes. The second in the form of an article on one of the subjects of the discipline or another one proposed by the student. Each practical component will have a weight of 50% in the weighting of the final grade.

In order to pass the course, a student needs to have a classification equal to or greater than 9 values in both components, practical and theoretical.

The works will be subject to individual evaluation, and individual defense of the final grade may be required.

As an alternative to this assessment, students may use the available exam periods. Since those who choose this alternative are not exempted from doing the practical component which will correspond to the same weight in the final grade.

There is no improvement or delivery of the first practical component outside the normal evaluation period.