

Course Contents and Rules

Técnicas de Perceção de Redes Network Awareness

**Mestrado em
Engenharia de Computadores e Telemática
DETI-UA**




Professor

- Prof. Paulo Salvador
 - ♦ Email: salvador@ua.pt
 - ♦ Web: <https://paulosalvador.net>
 - ♦ Discord: <https://discord.gg/bPPpKy5>
 - Change your nickname to **your real name**
 - Ask for TPR role.
 - ♦ Office: IEETA
- Office hours
 - ♦ Flexible
 - Discord and e-mail to schedule.



TPR Objectives

- Integration of acquired knowledge on communication network and systems.
- Understand and develop architectures and methodologies for 
 - Network and services monitoring,
 - Detection of attacks and functional anomalies, and
 - Deploy counter-measures and/or functional corrections.

Contents

- Characterization and identification of network usage profiles.
 - ♦ Acquisition, analysis and data mining of network information and statistics.
 - ♦ Characterization and classification of behaviors (activities/events).
 - ♦ Behavior anomaly detection methodologies.
- Prevention and detection of network intrusions.
 - ♦ Introduction to attack vectors.
 - ♦ Standard protection mechanisms/methodologies.
 - ♦ Detection of anomalies by known signatures.
 - ♦ Detection of behavior anomalies. ✓
 - ♦ Differentiation of licit and illicit accesses.
 - ♦ Counter-measures deployment.



Evaluation

- Final Grade =
 - $40\% * \text{Theoretical Grade} + 60\% * \text{Practice Grade}$
- Minimal grade: 7.0 in each component.
 - Theoretical Grade
 - ➔ Exam (40%) - Exam and/or Repeat Exam Seasons
 - Best grade is the one considered to calculate final grade.
 - Practice Grade
 - ➔ Project (60%) - in groups of 2 students (or 1 exceptionally).
 - First Presentation (20%) - November 9th
 - » Problem identification.
 - » Proposal of solution.
 - » Only presentation with slides, no report!
 - Final Presentation (40%) - last class.
 - » Presentation and demonstration of working solution.
 - During presentations/demo students must answer to specific questions. Grades may be different within a group.
 - ➔ Repeat Exam Season
 - The project can be improved (or fully redone).
 - Best grade is the one considered to calculate final grade.



Classes Planning (tentative)

	Class	Monday		Evaluation
1	18/Sep	Introduction.		
2	25/Sep	Cyber Situational Awareness.		
3	02/Oct	Data Acquisition.	TP: Data Acquisition	
4	09/Oct	Data Processing.	TP: Data Processing	
5	16/Oct		TP: Data Processing	
6	23/Oct		Project problem support + TP: Data Processing	
7	30/Oct		Project problem presentation	A1
8	06/Nov	Network (Entities) Profiling.	TP: Entity Profiling (Classification and Anomaly Detection)	
9	13/Nov		TP: Entity Profiling (Classification and Anomaly Detection)	
10	20/Nov		TP: Entity Profiling (Classification and Anomaly Detection)	
11	27/Nov		TP: Entity Profiling (Classification and Anomaly Detection)	
12	04/Dec		Project development	
13	11/Dec		Project development	
14	18/Dec		Project demo	A2
	25/Dec	Férias Natal		
	01/Jan			
				Exam



Bibliography

- Network Security with NetFlow and IPFIX: Big Data Analytics for Information Security, Omar Santos, Cisco Press, 1 edition (22 Sept. 2015), ISBN-13: 978-1587144387.
- Network Security Through Data Analysis: Building Situational Awareness, Michael S. Collins, O'Reilly Media, 1 edition (23 Feb. 2014), ISBN-13: 978-1449357900.
- Building an Information Security Awareness Program: Defending Against Social Engineering and Technical Threats, Bill Gardner, Valerie Thomas, Syngress; 1 edition (August 21, 2014), ISBN-13: 978-0124199675.
- Hacking: The Ultimate Beginners Guide, Max Green, CreateSpace Independent Publishing Platform (November 29, 2015), ISBN-13: 978-1519592668.
- Advanced Persistent Security: A Cyberwarfare Approach to Implementing Adaptive Enterprise Protection, Detection, and Reaction Strategies, Ira Winkler, Araceli Treu Gomes, Syngress; 1 edition (December 7, 2016), ISBN-13: 978-0128093160.
- Hacking Wireless Networks - The ultimate hands-on guide, Andreas Kolokithas, CreateSpace Independent Publishing Platform (March 5, 2015), ISBN-13: 978-1508476344.
- Hacking: Beginner's Guide to Expert Hacking, David Henry, (October 13, 2016).
- Outlier Analysis, Charu C. Aggarwal, Springer; 2nd ed. 2016 edition (January 2, 2017), ISBN-13: 978-3319475776.
- Designing Cisco Network Service Architectures (ARCH), John Tiso, Cisco Press, ISBN-13: 978-1587142888, 3rd Edition, 2011.
- Yusuf Bhajji, Network Security Technologies and Solutions (CCIE Professional Development), Cisco Press, 1st edition, 2008.

