[MNB103] Software Security

GENERAL INFORMATION

Studies	MASTER DEGREE IN DATA ANALYSIS, CYBERSECURITY AND CLOUD COMPUTING	**Subject**	Cybersecurity
Semester	2	**Course**	1
Character	COMPULSORY	**Mention / Field of specialisation**	
Plan	2024	**Modality**	Face-to-face
Language	ENGLISH		
Credits	6	**Hours/week**	0
Total hours	64 class hours + 86 non-class hours = **150 total hours**		

PROFESSORS

ZURUTUZA ORTEGA, URKO
ITURBE URRETXA, MIKEL

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M2N108 - Auditing software, using tools that allow the search for security vulnerabilities and being able to support the development of more secure software.		*x*		4,8
M2N206 - Having and understanding knowledge that provides a base or opportunity to be original in the development and/or application of ideas, often in an investigation context.		*x*		1,2
			Total:	6

KC: Knowledge or Content / SK: Skills / AB: Abilities

SECONDARY LEARNING RESULTS

RA231 Is capable of auditing software from a security point of view in order to evaluate its robustness and identify possible failures that may affect the correct functioning of the system.

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		11 h.	11 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	7 h.	9 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	12 h.		12 h.
Carrying out exercises and solving problems individually and/or in teams	8 h.	20 h.	28 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	60%
Individual written and/or oral tests or individual coding/programming tests	40%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 22 h.
NCH - Non-class hours: 38 h.
TH - Total hours: 60 h.

RA233 Is able to analyze, evaluate, contrast and select appropriate techniques to increase software security when dealing with problems or projects.

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	16 h.	20 h.	36 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and	4 h.		4 h.

procedures associated with the subjects

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	*(No mechanisms)*

CH - Class hours: 20 h.
NCH - Non-class hours: 20 h.
TH - Total hours: 40 h.

RA232 Is able to manage the entire software life cycle from a security point of view in order to minimize security errors in the software.

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	7 h.	9 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		11 h.	11 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	12 h.		12 h.
Carrying out exercises and solving problems individually and/or in teams	8 h.	10 h.	18 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	30%	*(No mechanisms)*
Individual written and/or oral tests or individual coding/programming tests	70%	

CH - Class hours: 22 h.
NCH - Non-class hours: 28 h.
TH - Total hours: 50 h.

CONTENTS

1. Software vulnerabilities
    1. Binary exploitation
        1. Introduction to Assembly language
        2. Low-level vulnerabilities: memory corruption
        3. Shellcoding and exploitation
        4. Other vulnerabilities: race conditions etc.
    2. Web security
2. Software protection
    1. Low-level protection
    2. Application protection and testing (fuzzing, robust programming)
3. Software analysis and vulnerability discovery
    1. Static Analysis
    2. Introduction to reverse engineering
    3. Malware dynamic analysis

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform Slides of the subject Class presentations	https://katalogoa.mondragon.edu/janium-bin/sumario.pl?Id=20241002093321