

## [MNB003] SOFTWARE SECURITY

### GENERAL INFORMATION

<b>Studies</b>	MASTER DEGREE IN DATA ANALYSIS, CYBERSECURITY AND CLOUD COMPUTING		<b>Subject</b>	Cybersecurity
<b>Semester</b>	2	<b>Course</b>	1	<b>Mention / Field of specialisation</b>
<b>Character</b>	COMPULSORY		<b>Language</b>	ENGLISH
<b>Plan</b>	2019	<b>Modality</b>	Adapted Face-to-face	<b>Total hours</b>
<b>Credits</b>	6	<b>Hours/week</b>	0	64 class hours + 86 non-class hours = <b>150 total hours</b>

### PROFESSORS

ZURUTUZA ORTEGA, URKO

ITURBE URRETXA, MIKEL

### REQUIRED PREVIOUS KNOWLEDGE

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

### SKILLS

#### VERIFICA SKILLS

##### SPECIFIC

**MNCE08** - Auditing software, using tools that allow the search for security vulnerabilities and being able to support the development of more secure software.

##### GENERAL

**MNCG02** - Using computer tools of cybersecurity new fields of application to solve complex problems and carry out engineering projects while considering the business and industrial context.

##### CROSS

**MNCTR1** - Ability to work in multidisciplinary teams and in a multilingual environment (Basque/Spanish/English) and to communicate, both orally and in writing, knowledge, procedures, results and ideas related to the life cycle of the data, cybersecurity, and development and operations.

##### BASIC

**M\_CB6** - To have and understand knowledge which provides a base or opportunity to be original in the development and/or application of ideas, often in an investigation context

### LEARNING RESULTS

**RA231** The student is able to audit software from a security point of view with the aim of evaluating its robustness and identifying possible failures that may affect the proper 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.

**RA232** The student is able to manage the entire software life cycle from the security point of view 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%	Individual written and/or oral tests or individual coding/programming tests	
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.

**RA233** The student is able to analyse, evaluate, contrast and select the appropriate techniques to increase the security of the software 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 procedures associated with the subjects	4 h.		4 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS	
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	100%	Individual written and/or oral tests or individual coding/programming tests	

CH - Class hours: 20 h.

NCH - Non-class hours: 20 h.

TH - Total hours: 40 h.

## CONTENTS

1. Software vulnerabilities
  1. Binary exploitation
    1. Introduction to Assembler language
    2. Low level vulnerabilities: memory corruption...
    3. Shellcoding & 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**

Moodle Platform  
Slides of the subject  
Presentations by external Lecturers  
Class presentations

**Bibliography**

[http://katalogoa.mondragon.edu/janium-bin/janium\\_login\\_opac\\_re\\_Ink.pl?grupo=MASTERDATUANALISIA12&ejecuta=20&](http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_Ink.pl?grupo=MASTERDATUANALISIA12&ejecuta=20&)