Course description

General information	
Course leader	**Thomas CHAUVOT DE BEAUCHENE, Maxime BOURGEOIS, Thomas NAVENNEC**
Course title	**Web Security**
Study programme	**Title of Expert in Information Technology**
Course status	**Graduate Program**
Year	2
Number of credits and mode of teaching delivery	ECTS student workload coefficient — 4
	Number of hours (L+E+S) — (6+10+72) 88

1. COURSE DESCRIPTION

1.1. Course objectives

The module 'Web Security' focuses on the concepts and notions of Web security.

1.2. Conditions for enrolment in the course

- Have a basic level of Javascript.
- Have a basic knowledge of SQL language.
- Have a good understanding of HTML and HTTP.

1.3. Expected learning outcomes of the course

LO1: Apply the basic notions of cryptography and encoding knowledge.

LO2: Compare and apply different cryptography algorithms (Base64, Hashes, Symmetric, Asymmetric).

LO3: Recommend and apply appropriate web application security mechanisms (CSRF, JWT, Input Sanitization, Password Storage Best Practices)

LO4: Discover and test web application weaknesses (XSS, SWLi, LFI…)

LO5: Conduct test on web application using major tools (Burp, Curl, nmap)

LO6: Discover and exploit vulnerabilities in web application

1.4. Course content

The lectures are structured on two days.

Lecture 1:

- Defining a server
- Basics of web server

- Tools
- Basics of encoding and crypto

Lecture 2:

- Authentication methods
- XSS
- SQLi
- Resources

The students work on a project related to Web security for one month. The students work on an online CTF (Capture the Flag) platform hosted & created by the teacher assistants which contains a series of cybersecurity challenges under the form of separate, vulnerable websites and web services. They must score points by identifying and exploiting those websites' weaknesses and registering the resulting "flag" on the CTFd platform. The score determines their grade.

1.5. Teaching delivery modes:	☒ lectures ☐ seminars and workshops ☐ exercises ☐ remote learning ☐ field work	☒ independent work ☐ multimedia and network ☐ laboratory ☒ mentoring ☐ other _____
1.6. Comments		For the lectures, the course material is taught interactively, giving the students time to ask questions and the teacher time to discuss related topics. As for the project, it is a competition between the students hosted on a CTFd platform, and the students are also given access to an online platform allowing them to collaborate and to ask questions to the teacher's assistants.
1.7. Student obligations		

STUDENT ATTENDANCE
Class attendance is mandatory in the percentage prescribed by the Studies and examination regulations.

PASSING EXAM
Each groups of students must submit their results to the teachers and give an oral presentation based on their results. The results are reviewed by the academic staff during an oral examination. A justification of the project work can be explained by the students.

1.8.	Monitoring[1] student work							
Class attendance		Activity during class		Seminar paper		Experimental work		
Written exam		Oral exam		Essay		Research		
Project	100 %	Continuous assessment of knowledge		Student report		Practical work		
Portfolio								

1.9.	Assessment and evaluation of student work during classes and the final exam

Every group of students gets a score on the online platform based on the challenges they solved. The score will highly determine the grade for the module. A bonus can be allocated to the grade for the presentation as well as if the students are performing well during the CTF.

CONCRETE REVIEW OF EVALUATION METHODS

The maximum number of points that a student can earn in a course is 100. Grades are calculated according to the following criteria table within which the distribution of passing grades in terms of the number of points is applied.

Points	Grade
0,00 - 50,00	(E) unsatisfactory
50,01 - 58,00	(D) sufficient
58,01 - 75,00	(C) good
75,01 - 92,00	(B) very good
92,01 - 100,00	(A) excellent

The method of accumulating points is determined in this course in accordance with the elements of scoring as follows:

Criterion	Maximum points
Project	100
TOTAL	100

1.10.	Required reading (at the moment of submitting the joint study programme report)

1.11.	Additional reading (at the moment of submitting the joint study programme report)

Root Me. 'Root Me: Hacking and Information Security learning platform', 2020. https://www.root-me.org

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[1] IMPORTANT NOTES: Next to each method of monitoring student work it is necessary to insert an adequate share of each activity in ECTS credits, so the total number of ECTS credits corresponds to the credit value of the course. You can use empty fields for additional activities.

Hack The Box. 'Hack The Box', 2020. https://www.hackthebox.eu

CTFtime Team. 'CTFtime', 2020. https://ctftime.org

XSS Game team. 'XSS Game', 2020. https://xss-game.appspot.com

1.12.   Number of copies of required reading in relation to the number of students who currently attend a course

Title	*Number of copies*	*Number of students*

1.13. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competencies.

The content of each modules is continuously revised to teach the students on the most up-to-date notions and concepts of IT. Indeed, the range of skills and knowledge in this sector is constantly getting broader, with a larger perspective of working in many different fields.

To ensure the quality of the teaching, a Steering Committee supervises the Quality Management System. The evolution of the teaching content is revised and validated by the Development Council. The teachers as well as the administration staff are evaluated by the students themselves. Finally, the teaching content is analysed and determined by evaluating the skills during the internships, by the partner companies.