






5.00 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Pereira Olivier ;Standaert François-Xavier ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Familiarity with the basic notions of cryptography is welcome
Main themes	<p>The exact course topics will change from year to year. Examples of relevant topics include techniques that make it possible to :</p> <ul style="list-style-type: none"> • compute on encrypted data; • build a database that can be queried without the server knowing which parts of it are accessed; • have anonymous communications; • make digital cash; • shuffle cards over the internet; • organize an election in which the organizers can't cheat; • have services with access control that keep users untraceable; • understand attacks against privacy, including de-anonymization/re-identification attacks, profiling, data mining and side-channel attacks; • identify privacy issues related to mass surveillance and solutions to prevent them.
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>Based on the LO referential of the program « Master in Electrical Engineering », this course contributes to the development, acquisition, and evaluation of the following learning outcomes :</p> <ul style="list-style-type: none"> • AA1.2, AA1.3, • AA2.2, AA2.3, AA2.5, • AA3.1, • AA5.1, AA5.3, AA5.4, AA5.6, 1 • AA6.1, AA6.2, AA6.3 <p>Specific learning outcomes of the course</p> <ul style="list-style-type: none"> • At the end of this class, the student will be able to : • Analyze the risks of attacks against correctness and privacy for a concrete system • Understand cryptographic and architectural tools allowing to mitigate privacy issues • Evaluate utility and privacy metrics for databases and distributed systems
Evaluation methods	<p>The final examination is based on exercises, based on the learning outcomes listed above. One or more mini-projects may be proposed during the semester and may contribute for at most 20% to the final grade. In any case, the grade of the mini-projects would only contribute to the final grade if it is beneficial to the grade.</p> <p>The exam of the January session is open-book, while the exam of the August session is closed-book.</p> <p>Details are available on Moodle.</p>
Teaching methods	<p>Lectures and exercise sessions.</p> <p>Homeworks and mini-projects may be proposed during the semester.</p>
Content	<p>Various themes will be discussed each year. These themes may include: secure two-party and multi-party protocols, oblivious memories, verifiable voting, crypto-currencies, verifiable computation, anonymous credentials, differential privacy and big data, post-Snowden cryptography.</p>
Inline resources	https://moodle.uclouvain.be/course/view.php?id=3249
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Computer Science and Engineering	INFO2M	5		
Master [120] in Computer Science	SINF2M	5		
Master [120] in Mathematical Engineering	MAP2M	5		
Master [120] in Data Science Engineering	DATE2M	5		
Master [120] in Data Science: Information Technology	DATI2M	5		