

## Appendix C — Cryptography-related Courses

Table 4 contains all courses found that explicitly mention *criptografia* (cryptography in portuguese) or derived terms that include *cript* (crypt) in their names and are Cybersecurity-related, such as *protocolos criptográficos* (cryptographic protocols), *criptomoedas* (cryptocurrencies), as well as other related expressions such as *assinatura digital* (digital signatures), *certificação digital* (digital certification), and *cifra* (ciphers). English expressions were also searched for, in case any course was offered in that language, but none were found.

The table is organized by state and institution, and it includes the translated course names, the translated topics associated with cryptography (based on the syllabus and/or program content), the workload, the semester in which they occur in the program, and whether they are mandatory or elective. When a course may be offered in different semesters, a closed interval  $x-y$  is used, where  $x$  is the earliest possible semester and  $y$  is the latest. In cases where the curricula and other institutional documents do not specify when a course is offered, the semester is considered undefined and the abbreviation *Undef.* is used to indicate it.

The table organizes the data alphabetically by state and alphabetically by institution acronym within each state. Each institution presents its list of mandatory courses, followed by elective ones. Within each category (mandatory/elective), the courses are ordered by program semester. For courses in the same semester, alphabetical order was used.

This part of the research was conducted on December 7, 2025.

**Table 4. Cryptography-related courses.**

State	Educational Institution	Course Name (List of Related Topics)	Workload	Stage	Mandatory/ Elective?
Paraná	UFPR	Cybersecurity <b>(Introduction to cryptography)</b>	60	7 <sup>a</sup>	Mandatory
		<b>Cryptography</b>	60	5 <sup>a</sup> -8 <sup>a</sup>	Elective
	UTFPR Campo Mourão	Systems Security and Auditing <b>(Introduction to cryptography, Symmetric cryptography, Asymmetric cryptography, Cryptographic protocols)</b>	72	6 <sup>a</sup>	Mandatory
	UTFPR Medianeira	Operating Systems <b>(Fundamentals of</b>	60	4 <sup>a</sup>	Mandatory

		<b>cryptography)</b>			
UTFPR Ponta Grossa	UTFPR Ponta Grossa	<b>Introduction to Cryptography</b>	60	4 <sup>a</sup> -8 <sup>a</sup>	Elective
		Systems Security and Auditing <b>(Cryptography)</b>	60	4 <sup>a</sup> -8 <sup>a</sup>	Elective
	UTFPR Santa Helena	Cybersecurity <b>(Data Security and Cryptology)</b>	60	7 <sup>a</sup>	Mandatory
Rio Grande do Sul	IFSul	Computer Network Security <b>(Study of cryptography protocols)</b>	60	6 <sup>a</sup>	Mandatory
	UFPel	Algorithms and Data Structures II <b>(Single Private Key Cryptosystems, Public Key Cryptosystems)</b>	68	5 <sup>a</sup>	Mandatory
		Computer Networks <b>(Cryptography concepts)</b>	68	6 <sup>a</sup>	Mandatory
		Computer Security <b>(Review of cryptography and cryptographic hashes)</b>	68	Undef.	Elective
	UFRGS	Computer Systems Security <b>(Single-key cryptography and public-key cryptography, Cryptographic protocols)</b>	60	Undef.	Elective
	UFSM	Distributed Systems <b>(Cryptography, Digital signatures)</b>	60	7 <sup>a</sup>	Mandatory
	UNIPAMPA	Topics in Systems and Information Security <b>(Cryptographic Primitives, Symmetric and Public Key Cryptography, Digital Signature and</b>	60	5 <sup>a</sup> -9 <sup>a</sup>	Elective

		<b>Certification)</b>			
		<b>Topics in Blockchain and Smart Contracts (cryptocurrencies)</b>	60	5 <sup>a</sup> -9 <sup>a</sup>	Elective
Santa Catarina	IFC Blumenau	<b>Cybersecurity (Cryptography)</b>	60	6 <sup>a</sup> -8 <sup>a</sup>	Elective
	IFC Concórdia	<b>Blockchain Technologies and Cryptocurrencies (Cryptographic primitives, Cryptocurrency concepts)</b>	60	8 <sup>a</sup> -10 <sup>a</sup>	Elective
	IFC Videira	<b>Security in Systems (Cryptographic Systems)</b>	60	8 <sup>a</sup>	Mandatory
	IFSC	<b>Cybersecurity (Cryptography algorithms and cipher modes)</b>	40	7 <sup>a</sup>	Mandatory
	UFFS	<b>Security and Systems Auditing (Principles of cryptography: symmetric and asymmetric cryptography. Authentication protocols: public key infrastructure and cryptographic applications and protocols)</b>	60	7 <sup>a</sup> -8 <sup>a</sup>	Elective
	UFSC	<b>Computer Security (Principles of cryptography: symmetric and asymmetric cryptography. Authentication protocols: (...) cryptographic protocols (S/MIME, IPsec, SSL, OpenSSH, Kerberos, VPNs))</b>	72	7 <sup>a</sup>	Mandatory