Co-funded by the Erasmus+ Programme of the European Union

LMPI - N°573901-EPP-1-2016-1-IT-EPPKA2-CBHE-JP
"Licence, Master professionnels pour le développement, l'administration, la gestion, la protection des systèmes et réseaux informatiques dans les entreprises en Moldavie, au Kazakhstan, au Vietnam »

Accreditation file

	Licence Pro	**Master**
Ho Chi Minh	non	création
Hanoi Agriculture	création	rénové
Hanoi Science et technology	rénové	rénové

rentrée 1ere session étudiants: sep2018

Grade: Mention:	*Bachelor* …	Domaine:	*CyberSecurity*

Université:	*VNUA*	**University Chair:**	
Date de conception:	…		

Author:	… …	… …	… …

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lmpi
licence master professionnel
en protection informatique

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Project N° 573901-EPP-1-2016-1-IT-EPPKA2-CBHE-JP

PROTOCOL OF PROJECT DOCUMENT VALIDATION

PROCES VERBAL DE VALIDATION DE DOCUMENT DU PROJET

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Name/nom	Ana Fernández Vilas
Function/fonction	Professor. Local Coordinator at University of Vigo

Date: 14 juin 2019

Signature:

UNIVERSIDADE DE VIGO - 1990
RECTOR

Ana Fernández Vilas

I. Context of the degree

a) *In which context you have a project to create the new curricula (aims, motifs...):*

In recent years, the demand for human resources in the field of information technology has increased strongly. In particular, courses in network security engineering are being pursued by many young people. It is the fact that Vietnam is one of the top 10 countries detected by cybercrime in 2016 (report by network security company Symantec, the United States). Many individuals, organizations and enterprises in Vietnam are victims of black hackers and the number of attacked networks is constantly increasing every day. That is the reason why companies and enterprises are trying to strengthen and protect their assets on the Internet by seeking high quality human resources for information technology protection. Creating the new curricula in Cybersecurity in Vietnam is necessary to adapt the demand of human resources in a period of flat world.

b) *List the potential jobs covered by the new curriculum, refer to the official job classification*

Students will be able to apply for a job at IT companies in areas like game creation, software or network system, etc. As network security experts, they will be able to work in many fields beyond IT such as banking, education, online services, e-commerce, hotels, aviation, defense, health, etc. Network security professionals do the work of protecting information, data, systems, and managing information. Students in the field of network security can choose website administration, website application testing, security analysis information, working with software or database.

c) *Indicate the predictions for the professional integration of young graduates.*

Graduates in the Cybersecurity Program who have ability to work in specialized units of Cyber Security, Information Technology and Network as well as IT enterprises such as government agencies, financial, banking, insurance and telecommunications agencies, fulfilling job positions like:

- Server and network security management
- Database security
- Analysis, consulting, and design of information system to ensure security.
- Testing and evaluation of information security for networks and system.
- Scan of vulnerabilities and handling information security incidents
- Programming and application development to ensure information security.

After a period of experience, the Cybersecurity bachelor will have the capabilities to handle information security responsibilities, such as team leader or director of information security, as well as having the capacity to work as a researcher and lecturer on information safety at research institutes, centers and training institutions.
Each year, 30-40 students of the new program will join the IT labour market after graduating

d) *Indicate the origin of the students admitted, their number, and the methods of recruitment.*

Candidates who graduated from high school in Vietnam will register and select the combination of subjects required in the information security major, for example Group A1 includes Maths, Physics and Chemistry, etc. Based on the results of high school graduation exams and other admission method, the candidates will be admitted if they meet the requirements of the Ministry of Education and Training in general, and VNUA in particular. The maximum number the Faculty of Information Technoloy can recruit each school year is about 120-150 students, thus 30-40 students in Cybersecurity program can be admitted.

(e) *Indicate whether the possibility of access to adult learners as part of lifelong learning is offered.*

The new degree is for everyone who is interested in Cybersecurity, especially for IT engineers having information technology background. Adults who are studying other Information Technology program easily follow Cybersecurity program because they have basic IT knowledge while studying the new degree, only some subjects are requested.

(f) *Indicate the possible pursuit of studies.*

With the knowledge and skills equipped, students can continue to study at the graduate level in the country and abroad in the field of information security, security and information technology.

g) *Indicate the modalities of composition of differentiated paths if necessary.*
There is no differentiated paths in the program.

II. General description of the curriculum

II.1. Description of training outcomes:

Training outcomes	Description
Disciplinary knowledge	Engineer on Data & Application security (B.Sc.)
Specific Skills	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14. To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15. The ability to understand security demands and design and implement software/hardware security solutions SC16. Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC17. The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event

	correlation techniques and tools. SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance). SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans. SC21. Skill in analysing and predicting trends in security aspects. SC22. Skill in analysing anomalous code as malicious or benign. SC23. The ability to know, understand and apply binary analysis techniques and tools. SC24. Skill in performing damage assessments. SC25. Ability to evaluate risks (risk assessment) SC26. To design/establish security policies, privacy policies and standards SC27. To make employees aware about corporate security policies and standards SC28. To design, develop and report monitoring indicators according to policies and standards SC29. Ability to describe and illustrate the risks, threats and solutions SC30. Skill in technical writing, reviewing and editing cyber-related Intelligence/assessment products from multiple sources. SC31. The ability to know, understand and apply database security techniques. SC32. The ability to know, understand and apply cloud computing security solutions.
Cross-curricular competencies	C1 Capacity of oral communication C2 Teamwork capacity C3 Problem solving capacity C4 Scheduling and planning ability

II.2. Decomposition of curricula in semesters

Fr/ bachelor = 3ans (180 ECTS) – Master =2 yeas (120 ECTS)
VN: bachelor=4 years, Master = 2 years
1 year of studies = 60 ECTS

Bachelor in Information Technology with a track in Cybersecurity

Year	Semester	Title of semester (*)	EU Educational units
			UE1. Principle of Marxism and Leninism 1 (4 ECTS) UE2. Basics of informatics (6 ECTS)

Year 1	S1	Mandatory (32 ECTS)	UE3. Physics for informatics (6 ECTS) UE4. Linear algebra (6 ECTS) UE5. Calculus (6 ECTS) UE6. Introduction to laws (4ECTS) UE7. An Introduction to CEFR-Based Tests (2ECTS). Note: Not included in the total accumulated credits UE8. General physical education (2ECTS). Note: Not included in the total accumulated credits UE9. Defense Education 1(6ECTS). Note: Not included in the total accumulated credits
Year 1	S2	Mandatory (36 ECTS) Optional (4 ECTS)	UE10. Principle of Marxism and Leninism 2 (6 ECTS) UE11. Probability and Statistics (6 ECTS) UE12. Discrete mathematics (6 ECTS) UE13. Computer architectures and Micro-processing (6 ECTS) UE14. Databases (6 ECTS) UE15. Programming Techniques (6 ECTS) UE16. Numerical methods (4 ECTS) UE17. Principles of Accounting (6 ECTS) UE18. English 0 (4 ECTS) UE19. Athletics, aerobic gymnastics, football, volleyball, basketball, badminton, chess, dance sport, swimming (2 ECTS). Note: Not included in the total accumulated credits UE20. Soft Skills: 90 periods (Choose 3 out of 6 modules, 30 lessons per session: Communication Skills, Leadership Skills, Self management Skills, Job Search Skills, Teamwork Skills, International integration skills) . Note: Note: Not included in the total accumulated credits UE21. Defense Education 2 (4ECTS). Note: Not included in the total accumulated credits
Year 2	S3	Mandatory (34 ECTS)	UE22. English 1 (6 ECTS) UE23. Database security (4 ECTS) UE24. Introduction to Software Engineering (4 ECTS) UE25. Data structures and Algorithms (6 ECTS) UE26. Practice for Data structures and Algorithms (2 ECTS) UE27. Object-Oriented Programming (6 ECTS) UE28. System analysis and design (6 ECTS) UE29. Defense Education 3 (6ECTS). Note: Not included in the total accumulated credits
	S4	Mandatory (32 ECTS) Optional (6 ECTS)	UE30. English 2 (6 ECTS) UE31. Principles of operating systems (6 ECTS) UE32. Computer networks (6 ECTS) UE33. Detecting Security Bugs and Vulnerabilities in Software (4 ECTS) UE34. Algorithm Complexity (4 ECTS) UE35. Web Application Development (6 ECTS) UE36. JAVA Programming (6 ECTS) UE37. Computer network design (6 ECTS)
Year 3	S5	Mandatory (28 ECTS)	UE38. English for ICT studies (4 ECTS) UE39. Ho Chi Minh Ideology (4 ECTS) UE40. Modelling and Control (4 ECTS) UE41. Information security (4 ECTS) UE42. Cryptology and Applications (6 ECTS) UE43. Linux and Open Software (6 ECTS)

Year 3		Optional (6 ECTS)	UE44. Web back-end Development (6 ECTS) UE45. Network administration (6 ECTS)
	S6	Mandatory (26 ECTS) Optional (6 ECTS)	UE46. Revolutionary guideline of Vietnamese Communist Party (6 ECTS) UE47. Environmental Management (4 ECTS) UE48. Economics of Trade and Services (4 ECTS) UE49. Malicious code analysis (4 ECTS) UE50. Strategic Security Management (4ECTS) UE51. Information System Security Audit (4 ECTS) UE52. Mobile Application Development (6 ECTS) UE53. Network and operating system security (6 ECTS)
Year 4	S7	Mandatory (24 ECTS) Optional (6 ECTS)	UE54. Internship (24 ECTS) UE55. Web Application Security and Testing (6 ECTS) UE56. Network security monitoring (6 ECTS)
	S8	Mandatory (20 ECTS)	UE57. Graduation thesis (20 ECTS)

II.3 Description of EU (educational units)

EU semester 1 (32 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h.)	TL (h.)	Pers. work	Total
UE1	Principles of Marxism and Leninism 1 (Mandatory)	M1: Introduction to basic principles of Marxism and Leninism M2: Dialectical materialism M3: Materialist dialectics M4: Historical materialism	4	30		0	60	90
UE2	Introduction to Informatics (Mandatory)	M1: Information and information representation M2: Computer organization M3: Computer software and operating system M4: Computer networks and the Internet M5: The social issues of information technology M6: MS Word & MS PowerPoint M7: MS Excel M8: Algorithms M9: Programming	6	45		0	90	135

UE3	Physics for informatics (Mandatory)	M1: Units and Measurements M2: Mechanics M3: Electrical Field M4: Electrical Currents and Electrical Sources M5: Electrical Materials M6: Introduction to Electronic Circuits M7: Magnetic field, Magnetic induction M8: Electromagnetic Field and Waves M9: Optical information M10: Introduction to Sensors and Applications M11: Introduction to an Electronic Circuits Design Software with Proteus software	6	30		15	90	135
UE4	Linear algebra (Mandatory)	M1: Matrix Algebra and Determinants M2: Systems of linear equations M3: Vector spaces M4: Diagonalization	6	45		0	90	135
UE5	Calculus (Mandatory)	M1: Funtions of one variable M2: Integration of functions of one variable M3: Sequenses and series of funtios M4: Multivariable functions M5: Multiple integral M6: Differential equations	6	45		0	90	135
UE6	Introduction to laws (Mandatory)	M1: Fundamental theoretical issues about the State and Law M2: Fundamental issues about the State and Law of the Socialist Republic of Vietnam M3: Basic contents of the Civil Law and the Criminal Law M4: Basic contents of the Economic Law, Labor Law, Marriage and Family Law M5: Basic contents of the Administrative Law and the	4	30		0	60	90

		Anti-corruption Law						
UE7	An Introduction to CEFR - Based Tests (Mandatory)	M1. Section A – Grammar and Reading M2. Section B - Listening	2	15		0	30	45
UE8	General physical education (Mandatory)		2	7.5		7.5	30	45
UE9	Defense Education 1		6	45		0	90	135

EU semester 2 (40 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h.)	TL (h.)	Pers. work	Total
UE10	Principle of Marxism and Leninism 2 (Mandatory)	M1: Theory of value M2: Theory of surplus value M3: Theory of capitalism ate monopoly capitalism M4: The Historical mission of the working class and the socialist revolution M5: The social and political issues in the process of socialist revolution M6: Socialism - reality and prospects	6	45		0	90	135
UE11	Probability and Statistics (Mandatory)	M1: Descriptive statistics M2: Probability M3: Random variables M4: Parameter estimation M5: Hypothesis testing M6: Simple linear regression	6	45		0	90	135
UE12	Discrete mathematics (Mandatory)	M1: Funtions of one variable M2: Integration of functions of one variable M3: Sequenses and series of funtios M4: Multivariable functions	6	45		0	90	135

		M5: Multiple integral M6: Differential equations						
UE13	Computer architectures and Micro-processing (Mandatory)	M1: General introduction M2: Computer system M3: Data representation and computer arithmetic M4: Central Processor Unit M5: Memory System M6: Input-output system M7: The basic structure of the 8088 M8: 8088 with memory M9: 8088 with Input-output system	6	45		0	90	135
UE 14	Databases (Mandatory)	M1: Overview of database M2: E/R Diagrams M3 : The Relational Data Model M4: Design Theory for relational databases M5: SQL M6: Query Optimization Basics M7: Data integrity and security	6	45		0	90	135
UE15	Programming Techniques (Mandatory)	M1: Overview of programming techniques M2: Introduction to the C programming language M3: Input/Output statements and control structures M4: Structured data types M5: Function M6: Pointer data type M7: File data type	6	30		15	90	135
UE16	Numerical methods (Optional)	M1: Approximation and errors M2: The approximate real value of a hidden equation M3: Approximate linear system of linear algebra M4: Interpolating polynomial and least squares method	4	30		0	60	90

		M5: Approximate derivative and integral M6: The approximation of the normal differential						
UE17	Principles of Accounting (Optional)	M1: Nature and object of book keeping operation M2: Financial report M3: Evaluation and Inventory M4: Accounting Methods and double entry M5: Valuation	6	30		15	90	135
UE18	English 0 (Mandatory)	M1: Let's begin M2: All about me M3: Tell me about your day M4: Let's go shopping M5: My family	4	30		0	60	90
UE19	Athletics, aerobic gymnastics, football, volleyball, basketball, badminton, chess, dance sport, swimming (Optional 2/9)		2	0		15	30	45
UE20	Soft skill Soft Skills: 90 periods (Choose 3 out of 6 modules, 30 lessons per session: Communication Skills, Leadership Skills, Self Management Skills, Job Search Skills, Teamwork Skills, International integration skills) (Optional 3/6)							
UE21	Defense Education 2		4	30		0	60	90

EU semester 3 (34 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h)	TL (h)	Pers. work	Total
UE22	English 1 (Mandatory)	M1: It's great job! M2: Great vacation M3: Cities around the world M4: Wildlife M5: All about sports	6	45		0	90	135
UE23	Database security (Mandatory)	M1: Overview of database security M2: Access control M3: Inference control M4: Flow control and data encryption M5: Advanced topics	4	30		0	60	90
UE24	Introduction to Software Engineering (Mandatory)	M1: Introduction M2: Software processes M3: Requirements engineering M4 : Design Software M5: Software testing M6: Software evolution	4	30		0	60	90
UE25	Data structures and Algorithms (Mandatory)	M1: Data structures and Algorithms M2: Arrays and Lists M3: Linked list M4: Tree M5: Graph M6: Sort M7: Search	6	45		0	90	135
UE26	Practice for Data structures and Algorithms (Mandatory)	M1: C/C++ programming with stack data structures, queues, single linked list, double linked list, binary tree, graph. M2: C/++ programming with sorting and searching algorithms.	2	0		15	30	45
UE27	Object-Oriented Programming (Mandatory)	M1: C ++ programming language M2: Object-oriented	6	30		15	90	135

		programming methods M3: Object-oriented programming analysis and design M4: Class and object M5: Function overloading and operator overloading M6: Constructor and destructor M7: Inheritance M8: Dynamic polymorphism, virtual function						
UE28	System analysis and design (Mandatory)	M1: Overview of System analysis and design M2: Situational survey and demand analysis M3: Object-oriented system analysis M4: object-oriented system design	6	45		0	90	135
UE29	Defense Education 3		6	45		0	90	135

EU semester 4 (38 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h.)	TL (h.)	Pers. work	Total
UE30	English 2 (Mandatory)	M1: Good luck, bad luck M2: My favourite things *M3:* Memorable experiences M4: I love chocolate M5: How can I help?	6	45		0	90	135
UE31	Principles of operating systems (Mandatory)	M1: General introduction M2: Operating system structure M3: Process M4: Thread M5: Process synchronization M6: CPU scheduling M7: Deadlock M8: Main memory	6	45		0	90	135

		M9: Virtual memory M10: I/O management and disk scheduling M11: File management						
UE32	Computer networks (Mandatory)	M1: Introduction to computer networks M2: Application layer M3: Transport layer M4: Network layer M5: Data link layer M6: Physical layer	6	37.5		7.5	90	135
UE33	Detecting Security Bugs and Vulnerabilities in Software (Mandatory)	M1: Overview M2: General Safety Information M3: Buffer Overflows M4: Unvalidated Input M5: TAIN Analysis M6: The vulnerabilities in web programming M7: Vulnerabilities in mobile programming	4	30		0	60	90
UE34	Algorithms and Complexity (Mandatory)	M1: Introduction to algorithms and complexity M2: The complexity of some algorithms M3: NP-complete & NP-hard	4	30		0	60	90
UE35	Web Application Development (Mandatory)	M1: Overview the Internet and WWW M2: HyperText Markup Language (HTML) M3: Cascading Style Sheets (CSS) M4 : JavaScript for Front-end M5: The Document Object Model (DOM) M6: Front-end Frameworks	6	30		15	90	135
UE36	JAVA Programming (Optional)	M1: Overview of Java programming language M2: The basic programming structures in Java M3: Classes and Objects M4: Object-oriented features in Java	6	30		15	90	135

		M5: Streams and files M6: Programming with database M7: Designing user interfaces						
UE37	Computer network design (Optional)	M1: Identify the needs and objectives of clients M2: Logical network design M3: Physical network design M4: Testing, Optimization, Writing Network design documentation	6	30		15	90	135

EU semester 5 (34 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h)	TL (h.)	Pers. work	Total
UE38	English for ICT studies (Mandatory)	M1: ICT in the workplace M2: Introduction to ICT systems M3: ICT in education M4: The Internet M5: Software development	4	30		0	60	90
UE39	Ho Chi Minh Ideology (Mandatory)	M1: Establishment, formation and development of Ho Chi Minh ideology M2: Ho Chi Minh's thoughts on national issues and the revolution of national liberation M3: Ho Chi Minh ideology of socialism and the transitional road to socialism in Vietnam M4: Ho Chi Minh ideology of the Communist Party of Vietnam M5: Ho Chi Minh's thoughts on the great national unity and international unity M6: Ho Chi Minh's idea of building the state of the people, by the people, for	4	30		0	60	90

		the people M7: Ho Chi Minh's thoughts on culture, morality and building new people						
UE40	Modelling and Control (Mandatory)	M1: The Basics of System Modelling M2: System model M3: Simulation method M4: Computer methods for modelling automated control systems M5: Continuous system simulation M6: Modelling of random systems M7: Simulate the queue system M8: Application Ident Tool in matlab to build a modelling automated control system	4	22.5		7.5	60	90
UE41	Information security (Mandatory)	M1: Overview of Information security M2: Confidentiality M3: Integrity M4: Trust	4	30		0	60	90
UE42	Cryptology and Applications (Mandatory)	M1: General introduction M2: Full secret encryption M3: Symmetric encryption M4: Message authentication code M4: Hash functions and applications M5: Build symmetric code in reality M6: Key management M7: Public encryption M8: Electronic Signature	6	45		0	90	135
UE43	Linux and Open Software (Mandatory)	M1: Introduction of open source software M2: Introduction to Linux operating system M3: Exploiting open source software M4: Building and developing open source	6	30		15	90	135

		software						
UE44	Web back-end Development (Optional)	M1: Overview of Web server and web back-end application M2: Statefull and stateless architectures M3: Asynchronous and parallel in HTTP Request processing M4: Working with Database management systems M5: Challenges in building a big web back-end development	6	30		15	90	135
UE45	Network administration (Optional)	M1: Windows Server 2012: Introduction, Install and Configuration M2: Active Directory Domain Services M3: IPv4 M4: Dynamic Host Configuration Protocol M5: Domain Name System M6: IPv6 M7: Group Policy and security configuration	6	30		15	90	135

EU semester 6 (32 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h.)	TL (h.)	Pers. work	Total
UE46	Revolutionary guideline of Vietnamese communist party (Mandatory)	M1: The birth of the Communist Party of Vietnam and the first political program of the Party M2: The way to fight the government of 1930-1945 M3: The Resistance colonialism and the Great American invasion M4: Industrialization	6	45		0	90	135

		M5: The way to a market economy oriented socialist M6: The way to build the political system						
UE47	Environmental Management (Mandatory)	M1: Basic issues of environmental management M2: The basis of environmental management M3: Tools in environmental management M4: State management system for environmental protection and environmental inspection M5: Environmental management of urban and industrial zones M6: Environmental management of rural and craft villages	6	45		0	90	135
UE48	Economics of Trade and Services (Mandatory)	M1: General introduction of trade and services M2: Distribution system of goods and services M3: E- commerce M4: Economic services M5: Business services and integration	6	45		0	90	135
UE49	Malicious code analysis (Mandatory)	M1: Introduction to malware M2: Static analysis M3: Dynamic analysis M4: Malware analysis on portable devices	4	30		0	60	90
UE50	Strategic Security Management (Mandatory)	M1: Introduction to Information Security Management System (ISMS) M2: Risk Assessment in Information Security M3: Setting up risk control measures M4: Setting ISMS	4	30		0	60	90
UE51	Information System Security Audit	M1: Overview of evaluate and verify information safety.	4	22.5		7.5	60	90

	(Mandatory)	M2: Information security risk management M3: ISO 27005 in information security assessment M4: Operating system verification M5: Network verification M6: Information security testing tools						
UE52	Mobile Application Development (Optional)	M1: Overview of Mobile App Development M2: Developing the Android App M3: Developing the iOS App	6	30		15	90	135
UE53	Network and operating system security (Optional)	M1: Introduction to Network Security M2: Threats to communications networks M3: The role of encryption in network security M4: Perform encryption in network M5: Authentication and access control	6	30		15	90	135

EU semester 7 (30 ECTS)

EU	Goals	Modules	ECTS	Lectures (hours)	TP (h.)	TL (h.)	Pers. work	Total
UE54	Internship (Mandatory)	M1: Study overview of the problem and the company where interns are training. M2: Planning M3 : Requirements Discovery, Requirements analysis and Requirements Specification M4: Design Software/Find solutions to the Problem M5: Implementation M6: Software testing	24	0		180	360	540
UE55	Web Application	M1: Overview of web	6	30		15	90	135

	Security and Testing (Optional)	applications M2: Common web application testing methods M3: Some tools support web application testing M4: Web application security						
UE56	Network security monitoring (Optional)	M1: Network Security Monitoring Rationale M2: Collecting Network Traffic: Access, Storage, and Management M 3: Stand-alone NSM Deployment and Installation M4: Distributed Deployment M5: OS Platform Housekeeping M6: Command Line Packet Analysis Tools M7: Graphical Packet Analysis Tools M8: NSM Consoles M 9: NSM Operations M 10: Server-side Compromise M11: Client-side Compromise M 12: Extending Security Onion M 13: Proxies and Checksums	6	30		15	90	135

EU semester 8 (20 ECTS)

EU	Goals	Modules	ECTS	Lectures	TP	TL	Pers. work	Total
UE57	Graduation thesis (Mandatory)	M1: Study overview of the problem M2: Planning M3 : Requirements Discovery, Requirements analysis and Requirements Specification M4: Design Software/Find	20	0		150	300	450

		solutions to the Problem M5: Implementation M6: Software testing						

II.3. Mapping between competences and learning units:

	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	GC11	SC13	SC14	SC15	SC16	SC17	SC18	SC19	SC20	SC21	SC22	SC23	SC24	SC25	SC26	SC27	SC28	SC29	SC30	SC31	SC32
UE1			x			x				x																					
UE2				x	x	x																									
UE3			x								x		x	x																	
UE4			x	x	x	x			x																						
UE5				x	x	x			x																						
UE6						x	x			x	x																				
UE7						x	x																								
UE8					x																										
UE9						x																									
UE10			x			x				x																					
UE11			x	x	x	x	x		x																						
UE12				x	x	x			x		x																				
UE13	x					x	x																								
UE14		x	x		x		x							x																x	
UE15		x			x	x							x																		
UE16		x		x	x																			x							
UE17		x				x		x																							
UE18						x	x																								
UE19					x																										

	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	GC11	SC13	SC14	SC15	SC16	SC17	SC18	SC19	SC20	SC21	SC22	SC23	SC24	SC25	SC26	SC27	SC28	SC29	SC30	SC31	SC32
UE20						x																									
UE21			x	x		x	x																								x
UE22	x					x						x	x		x			x				x	x	x	x		x	x	x	x	x
UE23		x			x	x	x						x	x																x	
UE24		x			x	x	x											x													
UE25		x	x	x	x	x				x				x		x															
UE26		x	x	x	x	x								x		x		x													
UE27		x	x	x	x	x								x	x	x															
UE28	x					x	x																								
UE29		x	x		x	x																									
UE30					x		x																								
UE31	x		x			x					x	x	x	x	x	x	x	x		x	x	x	x	x	x	x		x		x	x
UE32	x	x	x		x	x	x	x				x	x	x	x	x	x	x	x		x	x			x					x	x
UE33			x		x	x								x			x							x						
UE34		x			x	x	x									x														
UE35	x				x	x	x			x				x		x	x				x									
UE36		x			x	x								x					x											
UE37			x	x		x	x																								
UE38						x	x																								

	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	GC11	SC13	SC14	SC15	SC16	SC17	SC18	SC19	SC20	SC21	SC22	SC23	SC24	SC25	SC26	SC27	SC28	SC29	SC30	SC31	SC32
UE39			x			x				x																					
UE40	x		x			x						x				x				x	x				x						
UE41						x	x	x	x													x									
UE42		x		x	x	x								x		x				x	x			x	x					x	
UE43		x			x	x								x																	
UE44	x				x	x													x												
UE45		x	x	x		x	x	x	x	x	x																				
UE46			x			x				x																					
UE47		x				x		x																							
UE48		x				x		x																							
UE49	x	x	x	x	x	x		x				x	x	x		x			x	x	x	x	x								
UE50						x						x	x		x			x		x											
UE51	x										x		x	x																	
UE52			x		x	x	x	x								x		x												x	x
UE53	x				x	x	x					x	x	x	x		x	x	x	x											
UE54					x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
UE55	x				x	x	x			x		x	x	x		x	x	x						x				x		x	
UE56					x	x						x							x	x											
UE57						x		x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

II.4. The final dissertation

a) What will be asked from students for the dissertation (When? Number of pages? Relationship with the contents of formation.

The final dissertation is in the last (eighth) semester. There is no rule for number of pages. The dissertation's name and content have to be related to the content of the training program.

The students have to defend the thesis before a committee or jury formed by 3 members from the Faculty of Information Technology. Students must submit a written report to the jury, after approval by the advisor and the two reviewers. Publication of research papers in conferences or journals is optional, not a requirement.

b) Describe the role of the two types of tutors, the university tutor, the company tutor.

The university tutor is a responsibility of the academic advisor during the process of preparation of the thesis by the students. The company tutor is in charge of guideline reality issues which display in students' thesis based on the basic knowledge equipped at the university.

c) Describe the expected results of the final dissertation

An original, unpublished and significant contribution to the field of digital security and cyber security, in any of its possible domains of application (industry, manufacturing, administration, public services, societal services, baseline & fundamental technologies, applied products and services, etc.)

d) Describe the modalities of defense of final dissertation

Public defense to a jury or committee (45 minutes, including debate and questions with the committee members).

e) Indicate the timetable for the realization of the final dissertation

Two weeks before the online course registration of the University, the Faculty of Information Technology announces the list of qualified students.

- One week before the online course registration of the University, the Faculty of Information Technology publishes the list of names or directors of the thesis of the lecturers for reference. This list is unlimited, students can propose, discuss, and agree with their tutor to choose another topic.
- Registration period: Students who are eligible for the graduation thesis will register the module according to the general calendar of the University, contact their tutor to agree on the registration and implementation of the thesis.
- After registering for the course and before the graduation thesis: Students submit the registered topics with the tutor's certification for the Faculty. The Faculty and Department approve the list of theses, then submit the list to the President Board to make decisions.
- 7 days after the beginning of the graduation thesis time, students submit the syllabus with their advisor's certification to the Department.
- 4 weeks after the beginning of the graduation thesis time, the students submit the progress report with their advisor's certification for Faculty and Department.
- 10 weeks after the beginning of the graduation thesis time, students submit 02 thesis reports for the Department. Department assigns the lecturers who mark the instructor and reviewer one. The Department collects scores, report and soft report to submit to the Faculty a week later.

- After that, the Faculty publishes the list of eligible students to defend in front of the committee, sets up subcommittees to grade the graduation thesis. Each subcommittee has three qualified lecturers in accordance with regulations to submit to the President Board who makes the decision.
- Subcommittees grade each student, calculate the grade of the module according to the general regulations of the University, submit scores to the Faculty for submission to the Department of Training Management.

f) Indicate the number of ECTS granted to the final dissertation

20 ECTS.

II.5. Internship in company

a) Indicate the schedule of work placements

Internship at companies takes place at the 7th semester. The duration of the intership is 12 weeks (refer c for the information more detail in of the selection procedure)

(b) Indicate the types of enterprises and types of jobs to be done

Students implement the internship at the companies that need the high level security as banking, army, telecommunication, computer service, manufacturing, etc...The students can participate to design, manage, analyse a network system,...

c) indicate the procedures for follow-up of work placements, the role of the referring professor, the role of the company tutor.

Students find the internship by themselves or they can apply the internship in the companies which have the collaboration with the university.

- The companies and the faculty of information technology (FITA) exchange the plan and then give the schedule, the contents of the internship.
- FITA announces internship placements to students
- The companies interview and select the students for the internship placements
- The results should be sent to FITA
- The staff of company (company tutor) is responsible to train the studenst during the internship.
- At the end of the internship, the companies review and evaluate the results and send a report to FITA.
- The lecturer of FITA (referring professor) is responsible to evaluate the results of students and to ensure quality and also the other requirements of Vietnam National University of Agriculture.

II.6. Internship in a company abroad

a) Indicate the schedule of internships abroad

(b) Indicate the types of enterprises and jobs corresponding to the content of the training

c) indicate the contents of the teaching contract binding the host company and the university (specifications or agreement model to be included in the annex)

d) indicate how the internship will be assessed abroad, the number of ECTS granted to this EU

II.7. Mobility to foreign companies (if any)

a) List universities abroad with a partnership with your university and the chairs (or department, or institute) concerned

b) Indicate the areas, diplomas for which a period of mobility is possible

III Modalities for the control of knowledge

For each EU, indicate the methods of checking knowledge

According to a general rule of VietNam Natational University of Agriculture, Each EU will has three scores:

- Attendance Score (0.1), Students must attend more than 75% of time in the class or the pratice room to be eligible for the final exam.
- Mid-term Score (0.3): Student has to do a project related the EU (individual or group) and must defend it, or written....
- Final Score (0.6): Form of examination (written, oral, practical), duration of the control: 60 – 75 minutes.
- Score: on a scale from 0 to 10

b) Indicate the rules of obtaining a EU (UE)

- Rules for the allocation of EU: EU score is an average of the attendance score, the mid-term score and the final score.
- Compensation rule between units (if applicable)
- Period of validity of a EU obtained (UE): EU score is greater than or equal to 4.0
- Eliminary scores: EU score is smaller than 4.0

IV Composition of pedagogical team

a) The general pedagogical responsible of the new curriculum

Name : TRẦN First name : Đức Quỳnh Function : Dean-FITA University : VNUA

b) Pedagogical responsibles by EU Educational units (Teachers by EU)

EU	Responsible of EU	University of attachment
UE1	Lecturer from Faculty of Social science	Vietnam National University of Agriculture
UE2	Ngo Cong Thang	Vietnam National University of Agriculture
UE3	Nguyen Tien Hien	Vietnam National University of Agriculture
UE4	Nguyen Xuan Thao	Vietnam National University of Agriculture
UE5	Nguyen Xuan Thao	Vietnam National University of Agriculture
UE6	Lecturer from the Faculty of Social science	Vietnam National University of Agriculture
UE7	Lecturer from the Faculty of Education and Foreign Languages	Vietnam National University of Agriculture

UE8	Lecturer from the Faculty of Physical Education	Vietnam National University of Agriculture
UE9	Lecturer from the Faculty of National Defense and Security Education	Vietnam National University of Agriculture
UE10	Lecturer from the Faculty of Social science	Vietnam National University of Agriculture
UE11	Nguyen Thi Lan	Vietnam National University of Agriculture
UE12	Nguyen Thi Thuy Hanh	Vietnam National University of Agriculture
UE13	Pham Quang Dung	Vietnam National University of Agriculture
UE 14	Hoang Thi Ha	Vietnam National University of Agriculture
UE15	Ngo Cong Thang	Vietnam National University of Agriculture
UE16	Hoang Thi Thanh Giang	Vietnam National University of Agriculture
UE17	Lecturer from Faculty of Accounting and Business Managment	Vietnam National University of Agriculture
UE18	Lecturer from the Faculty of Education and Foreign Languages	Vietnam National University of Agriculture
UE19	Lectuer from the Faculty of Physical Education	Vietnam National University of Agriculture
UE20	Lectuer from Centre for Soft Skills Training	Vietnam National University of Agriculture
UE21	Lecturer from the Faculty of National Defense and Security Education	Vietnam National University of Agriculture
UE22	Lecturer from the Faculty of Education and Foreign Languages	Vietnam National University of Agriculture
UE23	Pham Viet Nga	Vietnam National University of Agriculture
UE24	Ngo Cong Thang	Vietnam National University of Agriculture
UE25	Ngo Cong Thang	Vietnam National University of Agriculture
UE26	Ngo Cong Thang	Vietnam National University of Agriculture
UE27	Tran Trung Hieu	Vietnam National University of Agriculture
UE28	Tran Thi Thu Huyen	Vietnam National University of Agriculture
UE29	Lecturer from the Faculty of National Defense and Security Education	Vietnam National University of Agriculture
UE30	Lecturer from the Faculty of Education and Foreign Languages	Vietnam National University of Agriculture
UE31	Pham quang Dung	Vietnam National University of Agriculture
UE32	Pham Quang Dung	Vietnam National University of Agriculture
UE33	Phan Trong Tien	Vietnam National University of Agriculture

UE34	Tran Duc Quynh	Vietnam National University of Agriculture
UE35	Nguyen Van Hoang	Vietnam National University of Agriculture
UE36	Tran Trung Hieu	Vietnam National University of Agriculture
UE37	Pham Quang Dung	Vietnam National University of Agriculture
UE38	Lecturer from the Faculty of Education and Foreign Languages	Vietnam National University of Agriculture
UE39	Lecturer from the Faculty of Social science	Vietnam National University of Agriculture
UE40	Lecturer from the Faculty of Mecanics	Vietnam National University of Agriculture
UE41	Nguyen Van Hoang	Vietnam National University of Agriculture
UE42	Tran Duc Quynh	Vietnam National University of Agriculture
UE43	Phan Trong Tien	Vietnam National University of Agriculture
UE44	Nguyen Van Hoang	Vietnam National University of Agriculture
UE45	Pham Quang Dung	Vietnam National University of Agriculture
UE46	Lecturer from the Faculty of Social science	Vietnam National University of Agriculture
UE47	Lecturer from the Faculty of Environment	Vietnam National University of Agriculture
UE48	Lecturer from the Faculty of Accounting and Business Managment	Vietnam National University of Agriculture
UE49	Ngo Cong Thang	Vietnam National University of Agriculture
UE50	Tran Duc Quynh	Vietnam National University of Agriculture
UE51	Nguyen Hoang Huy	Vietnam National University of Agriculture
UE52	Tran Trung Hieu	Vietnam National University of Agriculture
UE53	Pham Quang Dung	Vietnam National University of Agriculture
UE54	Faculty (FITA) and Company	Vietnam National University of Agriculture
UE55	Hoang Thi Ha	Vietnam National University of Agriculture
UE56	Nguyen Thi Thuy	Vietnam National University of Agriculture
UE57	Faculty (FITA) and Company	Vietnam National University of Agriculture

c) Teachers involved in the curriculum (=renovateurs)

Name	University	Disciplines taught	Number of hours of intervention(est)	Concerned EU
Tran Duc Quynh	VNUA	Algorithms, Security, Management	120	UE33, UE42,UE51
Pham Quang Dung		Network, Secutiy	180	UE 13, UE30, UE31, UE 36, UE45, UE54
Nguyen Van Hoang	VNUA	Encryption and data security	90	UE34, UE41, UE44
Nguyen Thi Thuy	VNUA	Security	30	UE56
Phan Trong Tien	VNUA	Operating system	70	UE43, UE32
Pham Viet Nga	VNUA	Database Security	45	UE22

d) Professionals involved in the curriculum
(=professionals animating a training course/a lecture on a professional theme)

Name	Company	Disciplines taught	Number of hours of intervention(est)	Concerned EU
Nguyen Trong phuc and Staffs of IFI	IFI Solution	Software Development	330	Internship, Thesis
Nguyen Huu Tuan and Staffs of Network Center	Network Center of VNUA	Network and Security	430	Internship, Thesis
Ta Minh Thuy	Banking	Security	430	Internship, Thesis
Phan Trong Tien	BacHa Hospital	Security	150	UE43,UEE32
Nguyen Hoang Huy and Staffs of MVC	MVC	Information System	90	UE52
Pham Quang Dung and Staff of VNUA-IT Center	VNUA-IT Center	Network, Security	250	UE 13, UE30, UE31, UE45, UE54
Tran Van Hoang and Staffs of VietED	VietED	Ìnformation System	330	Internship, Thesis
Nguyen Tuan Dung and Staffs of Viking	Viking	Management	330	Internship, Thesis

NB: the number of hours of intervention of professionals must be 30% of the total hours.

V Professional Insertion

a) Indicate the methods used to support the professional integration of young graduates

Whether the students are looking for a job or an internship, there are a number of search strategies available to obtain their dream position.

- The Faculty of Information Technology has professional internship agreements with many companies. Additionally, most companies offer internship positions for our students. The internship programs are designed by the companies to supply students with required technical training. The students will be evaluated after the interview to identify potential candidates suitable for becoming interns or employees. However, the faculty also proposes different external internship subjects of the study programs. Each study program is assigned coordinator(s) who advise students on practical issues. The students can find information about the coordinators on the study program's website and do the optional external internships in the companies.
- The Faculty usually organizes many conferences and meetings with the companies. This is one of the regular activities to create a good relationship with the companies to orient careers for students after graduated.
- Every year, the University holds Annual Job Fair Day with the participation of hundreds of companies and thousands of job positions in many varieties of areas including information technology. This is the annual activity of the University to create conditions for graduates to find stable and suitable jobs and they have many opportunities to train job skills, career orientation, access to the labour market and employers.
- As a rule, a student can find a job or an internship by himself/herself; if necessary, with the help of internship coordinator/administrative training assistant. All job and internship listings are posted on the study program's website. The students can follow the information to apply a job or an external internship.

(b) Indicate the composition and role of the employment office of the university

The Employment Counselling and Student Support Centre (http://tvvl.vnua.edu.vn/) and Human Resource Supply Centre (http://vieclamnongnghiep.vn/) at the University are the places where transfer the student more useful information for career orientation, internship opportunities, recruiting plan as well as job positions in Vietnam and other countries. The objectives are to provide students with a centralized information system of employment opportunities around campus, standardized procedures for student employments and career building skills.
These employment offices are open Monday through Friday 8 AM - 5 PM and closed during chapel and all regular university holidays.
Students who are interested in applying for employment positions can visit these offices located in the University. Employment opportunities can be found online at the website:
http://tvvl.vnua.edu.vn/ and http://vieclamnongnghiep.vn/

VI. Subjects

UE1: Principle of Marxism and Leninism 1

	Subject: Principle of Marxism and Leninism 1
Course	
ECTS	**4**

Character	**Mandatory**	
Semester	**1**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3. Critical thinking GC6. Ability for self-study GC10. Representation skill: Ability to represent, illustrate, convince	
Specific competences		
Transversal competences		
Learning outcomes	The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects	
Contents	M1: Introduction to basic principles of Marxism and Leninism M2: Dialectical materialism M3: Materialist dialectics M4: Historical materialism	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE2: Basics of informatics

	Subject: Basics of informatics
Course	
ECTS	**6**
Character	**Mandatory**
Semester	**1**
Languages in which it	**Vietnamese**

is taught		
Basic and general competences	GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences		
Transversal competences		
Learning outcomes	Explain the basic concepts, social and legal issues in the field of information technology; Explain how to represent some types of basic data on computers, computer architecture and computer networks, roles and principles of the operating system, basic principles of communication and information security in computer and computer networks; Explain the principles and techniques of programming, how a program is executed on the computer; Ability to use computers, Internet and office applications for basic work.	
Contents	M1: Information and information representation M2: Computer organization M3: Computer software and operating system M4: Computer networks and the Internet M5: The social issues of information technology M6: MS Word & MS PowerPoint M7: MS Excel M8: Algorithms M9: Programming	
Observations		
Teaching methodologies (include list)	Lecture, Demonstration, Problem solving, Show and tell, Work assignment, Practice.	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE3: Physics for Informatics

	Subject: Physics for Informatics
Course	
ECTS	**6**
Character	Mandatory

Semester	**1**	
Languages in which it is taught	Vietnamese	
Basic and general competences	GC3: Critical thinking GC11: Skill in conducting trend analysis	
Specific competences	SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15: The ability to understand security demands and design and implement software/hardware security solutions	
Transversal competences		
Learning outcomes	Finishing the course, learners will acquires knowledge on mechanical motion, phenomenon and laws involving the electrical and magnetic movements. These knowledges are the supports for the learners to follow specific competance courses. This course also help learners to develop their self-studying skill and partial team-work skill	
Contents	M1: Units and Measurements M2: Mechanics M3: Electrical Field M4: Electrical Currents and Electrical Sources M5: Electrical Materials M6: Introduction to Electronic Circuits M7: Magnetic field, Magnetic induction M8: Electromagnetic Field and Waves M9: Optical information M10: Introduction to Sensors and Applications M11: Introduction to an Electronic Circuits Design Software with Proteus software	
Observations		
Teaching methodologies (include list)	- Lecturing - Demonstration - Discussion - Problems-solving instructing - Question responding	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with	**10**	**100**

possibility of final exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE4: Linear Algebra

	Subject: Linear Algebra
Course	
ECTS	**6**
Character	**Mandatory**

Semester	**1**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3. Critical thinking GC4. Creativity and Reactivity GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study GC9. Time management skill	
Specific competences		
Transversal competences		
Learning outcomes	- Apply the basic knowledge of mathematics and natural sciences to solving theoretical and practical issues related to information security, thereby developing new knowledge and continuing studying at higher levels. - Present basic knowledge on management, economics, environmental protection. - Self-orientated, adapt to different working environments; Being aware of the necessity of self-learning, accumulation of knowledge and experience to improve the professional level to meet the job requirements.	
Contents	M1: Matrix Algebra and Determinants M2: Systems of linear equations M3: Vector spaces M4: Diagonalization	
Observations		
Teaching methodologies (include list)	**Lecturing**	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work	**10**	**100**

and activities		

UE5: Calculus

	Subject: Calculus
Course	
ECTS	6 ECTS
Character	Mandatory
Semester	1

Languages in which it is taught	Vietnamese	
Basic and general competences	GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC9: Time management skill	
Specific competences		
Transversal competences		
Learning outcomes	This module provides learners with knowledge about functions of one variable, integration of functions of one variable, sequences and series of functions, multivariable functions, multiple intergral and differential equations.	
Contents	M1: Funtions of one variable M2: Integration of functions of one variable M3: Sequenses and series of funtios M4: Multivariable functions M5: Multiple integral M6: Differential equations	
Observations		
Teaching methodologies (include list)	Teaching theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE6: Introduction to laws

	Subject: Introduction to laws
Course	
ECTS	4 ECTS
Character	Mandatory
Semester	1

Languages in which it is taught	Vietnamese	
Basic and general competences	GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork) GC10. Representation skill: Ability to represent, illustrate, convince GC11. Skill in conducting trend analysis	
Specific competences		
Transversal competences		
Learning outcomes	This module provides learners with apply knowledge of social science and humanities to career and life.	
Contents	M1: Fundamental theoretical issues about the State and Law M2: Fundamental issues about the State and Law of the Socialist Republic of Vietnam M3: Basic contents of the Civil Law and the Criminal Law M4: Basic contents of the Economic Law, Labor Law, Marriage and Family Law M5: Basic contents of the Administrative Law and the Anti-corruption Law	
Observations		
Teaching methodologies (include list)	Teaching theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE7: An Introduction to Cefr - Based Tests

	Subject: An Introduction to Cefr - Based Tests
Course	
ECTS	**2ECTS**
Character	**Mandatory**

Semester	**1**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	Students can ability to write simple reports, present opinions related to professional work.	
Contents	M1. Section A – Grammar and Reading M2. Section B - Listening	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE10: Principle of Marxism and Leninism 2

	Subject: Principle of Marxism and Leninism 2
Course	
ECTS	**6ECTS**

Character	**Mandatory**	
Semester	**2**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3. Critical thinking GC6. Ability for self-study GC10. Representation skill: Ability to represent, illustrate, convince	
Specific competences		
Transversal competences		
Learning outcomes	Students can apply knowledge of social science and humanities to career and life.	
Contents	M1: Theory of value M2: Theory of surplus value M3: Theory of capitalism and State monopoly capitalism M4: The Historical mission of the working class and the socialist revolution M5: The social and political issues in the process of socialist revolution M6: Socialism - reality and prospects	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises	**10**	**100**
Practical tests	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE11: Probability and Statistics

	Subject: Probability and Statistics
Course	
ECTS	**6 ECTS**
Character	**Mandatory**

Semester	**2**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3: Critical thinking GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork) GC9: Time management skill	
Specific competences		
Transversal competences		
Learning outcomes	After successfully completing this course you should be able to: - Apply the concept of probability and probability rules to practical problems. - Identify the characteristic numbers of random variables. - Summarize the basic knowledges of sampling theory, descriptive statistics - Apply the problems of estimation, statistical hypothesis testing, correlation and regression.	
Contents	M1: Descriptive statistics M2: Probability M3: Random variables M4: Parameter estimation M5: Hypothesis testing M6: Simple linear regression	
Observations		
Teaching methodologies (include list)	- Lecturing method; - Teaching with multi-media.	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE12: Discrete mathematics

	Subject: Discrete mathematics
Course	
ECTS	**6**
Character	Mandatory

Semester	**2**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC4 : Creativity and Reactivity GC5 : Ability to apply theoretical knowledge to practice GC6 : Ability for self-study GC9 : Time management skill GC11 : Skill in conducting trend analysis	
Specific competences		
Transversal competences		
Learning outcomes	Students have the skills of mathematical thinking and apply the theoretical knowledge they have learned in a number of practical problems	
Contents	M1: Counting problem M2: Basic concepts of graphs M3: Eulerian Graphs, Hamiltonian Graphs, Bisection Graphs, flat Graphs M4: Trees and some applications of trees M5: Some optimization problems on the graph M6: Introduction to Mathematical Logic	
Observations		
Teaching methodologies (include list)	Teaching theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE13 : Computer architectures and micro – procesing

	Subject: Computer architectures and micro - procesing
Course	

ECTS	**6**	
Character	**Mandatory**	
Semester	**2**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	The module aims to help students gain skills in analyzing the behavior of computer system components, assessing the effectiveness of management methods, memory access and data exchange.	
Contents	M1: General introduction M2: Computer system M3: Data representation and computer arithmetic M4: Central Processor Unit M5: Memory System M6: Input-output system M7: The basic structure of the 8088 M8: 8088 with memory M9: 8088 with Input-output system	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises	**10**	**100**
Practical tests	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE14 : Database

	Subject: Database
Course	
ECTS	**6**

Character	**Mandatory**	
Semester		
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2. Problem solving ability, design ability GC3. Critical thinking GC5. Ability to apply theoretical knowledge to practice GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences	**SC15.** The ability to understand security demands and design and implement software/hardware security solutions SC31. The ability to know, understand and apply database security techniques.	
Transversal competences		
Learning outcomes	At the end of this class, the successful student will: - Have a broad understanding of database concepts and database management system software - Have a high-level understanding of major DBMS components and their function - Be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model. - Understand Data Normalization You understand functional dependencies and their relationship to keys You understand BCNF and 3NF You can find keys given a set of functional dependencies You can identify tables that are not normalized You can decompose unnormalized tables into BCNF and/or 3NF compliant tables. - Be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.	
Contents	M1: Overview of database M2: E/R Diagrams M3 : The Relational Data Model M4: Design Theory for relational databases M5: SQL M6: Query Optimization Basics M7: Data integrity and security	
Observations		
Teaching methodologies (include list)	Combine teaching theory with practice	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**

Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE15 : Programming Techniques

	Subject: Programming Techniques
Course	
ECTS	**6**
Character	**Mandatory**

Semester	**2**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2: Problem solving ability, design ability GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences	SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system	
Transversal competences		
Learning outcomes	Knowledge: The candidate will get knowledge of: - Overview of programming techniques - The C programming language Skills: - Programming with the C language	
Contents	M1: Overview of programming techniques M2: Introduction to the C programming language M3: Input/Output statements and control structures M4: Structured data types M5: Function M6: Pointer data type M7: File data type	
Observations		
Teaching methodologies (include list)	Theory teaching, practice teaching	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

	Subject: Numerical methods	
Course		
ECTS	4	
Character	Optional	
Semester	2	
Languages in which it is taught	Vietnamese	
Basic and general competences	**GC2:** Problem solving ability, design ability **GC4:** Creativity and Reactivity **GC5:** Ability to apply theoretical knowledge to practice	
Specific competences	**SC25:** Ability to evaluate risks (risk assessment)	
Transversal competences		
Learning outcomes	Students can apply some basic numerical methods to simple exercises in solving one-variable equation, solving system of linear equations, finding approximate function, calculating derivative and integral, solving normal differential equations, especially, the iterative methods.	
Contents	M1: Approximation and errors M2: The approximate real value of a hidden equation M3: Approximate linear system of linear algebra M4: Interpolating polynomial and least squares method M5: Approximate derivative and integral M6: The approximation of the normal differential	
Observations		
Teaching methodologies (include list)	Presenting on theory Guiding classroom discussions	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Evaluation systems		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

	Subject: Principles of Accounting	
Course		
ECTS	6ECTS	
Character	Optional	
Semester	2	
Languages in which it is taught	Vietnamese	
Basic and general competences	GC2. Problem solving ability, design ability GC6. Ability for self-study GC8. Ability to project organization and planning	
Specific competences		
Transversal competences		
Learning outcomes	Present basic knowledge on management, economics, environmental protection	
Contents	M1: Nature and object of book keeping operation M2: Financial report M3: Evaluation and Inventory M4: Accounting Methods and double entry M5: Valuation	
Observations		
Teaching methodologies (include list)	Presenting on theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Evaluation systems		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE18: English 0

	Subject: English 0	
Course		
ECTS	**4ECTS**	
Character	**Mandatory**	
Semester	**2**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	Students can use basic English grammar and the vocabulary needed to communicate simple topics like familiarity with oneself, family, daily activities, work shopping. In addition, students can hear simple conversations about the topics they have learned; read simple introductory essays, short and simple short stories on short topic topics on social networking sites	
Contents	M1: Let's begin M2: All about me M3: Tell me about your day M4: Let's go shopping M5: My family	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**

Evaluation of work and activities	**10**	**100**

UE22: English 1

	Subject: English 1	
Course		
ECTS	**6ECTS**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	Students learn basic English grammar and the vocabulary needed to communicate simple topics such as work, vacation, city, wildlife, and sports. In addition, students can hear simple conversations about the topics they have learned; Readers understand simple articles that serve the purpose of capturing information	
Contents	M1: It's great job! M2: Great vacation M3: Cities around the world M4: Wildlife M5: All about sports	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE23: Database Security

	Subject: Database Security	
Course		
ECTS	**4**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2: Problem solving ability, design ability GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork)	
Specific competences	SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system SC15: The ability to understand security demands and design and implement software/hardware security solutions SC31: The ability to know, understand and apply database security techniques	
Transversal competences		
Learning outcomes	Knowledge: The candidate will get knowledge of: - Overview of database security - Database attacks - Prevention techniques Skills: - Designing and protecting database systems	
Contents	M1: Overview of database security M2: Access control M3: Inference control M4: Flow control and data encryption M5: Advanced topics	
Observations		
Teaching methodologies (include list)	Theory teaching, practice teaching, and project implementing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**22.5**	**25%**
Lab practices	**7.5**	**8.4%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests/ or exercises	**10**	**100**

Practical tests	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE24: Introduction to Software Engineering

	Subject: Introduction to Software Engineering	
Course		
ECTS	**4**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2. Problem solving ability, design ability GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences	SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance).	
Transversal competences		
Learning outcomes	*On successful completion of this course students will be able to:* - Students understand the basic concepts of software engineering - Students understand the software process model - Explain the issues of producing quality software - Students apply the theory of software engineering to gather requirements, analyze the requirements and write quality specification documents. - Discuss the different aspects in producing quality software. - Students have the ability to design test cases for softwares.	
Contents	M1: Introduction M2: Software processes M3: Requirements engineering M4 : Design Software M5: Software testing M6: Software evolution	
Observations		
Teaching methodologies (include list)	Combine teaching theory with practice	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise	**30**	**33.3%**

solving		
Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE25: Data structures and Algorithms

	Su**bject: Data structures and Algorithms**	
Course		
ECTS	**6**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2: Problem solving ability, design ability GC3: Critical thinking GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC10: Representation skill: Ability to represent, illustrate, convince	
Specific competences	SC15: The ability to understand security demands and design and implement software/hardware security solutions. SC17: The ability to know, understand and apply code analysis techniques.	
Transversal competences		
Learning outcomes	Explain the role of data structures and algorithms in computer programming, explaining the relationships between data structures, storage structures, and algorithms; distinguish data structure and storage structure; summarizes the steps of designing algorithms, analyzing and evaluating simple algorithms; summarizes, explains the common data structures and operations on those data structures; summarizes, evaluates the complexity of sorting and searching algorithms; Select the appropriate data structure and algorithms to match the problem to be solved; utilize pseudo-algorithmic writing and program from pseudocode.	
Contents	M1: Data structures and Algorithms M2: Arrays and Lists M3: Linked list M4: Tree M5: Graph M6: Sort M7: Search	
Observations		
Teaching methodologies (include list)	Lecture, Demonstration, Problem solving, Show and tell, Work assignment.	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**

Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE26: Practice for Data structures and Algorithms

	Subject: Practice for Data structures and Algorithms	
Course		
ECTS	**2**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2: Problem solving ability, design ability GC3: Critical thinking GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences	SC15: The ability to understand security demands and design and implement software/hardware security solutions. SC17: The ability to know, understand and apply code analysis techniques. SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance)	
Transversal competences		
Learning outcomes	Practice programming of data structures and algorithms learned; Use data structures and algorithms in programming in C/C++ to create programs for a specific problem; Explain the role and importance of data structures and algorithms in building software.	
Contents	M1: C/C++ programming with stack data structures, queues, single linked list, double linked list, binary tree, graph. M2: C/++ programming with sorting and searching algorithms.	
Observations		
Teaching methodologies (include list)	Practice, Demonstration, Problem solving, Show and tell, Work assignment.	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**0**	**0**
Lab practices	**15**	**33.3%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises	**10**	**100**
Practical tests	**10**	**100**

Evaluation of work and activities	**10**	**100**

UE27: Object-Oriented Programming

	Subject: Object-Oriented Programming	
Course		
ECTS	**6**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2: Problem solving ability, design ability GC3: Critical thinking GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences	SC15: The ability to understand security demands and design and implement software/hardware security solutions. SC16: Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC17: The ability to know, understand and apply code analysis techniques.	
Transversal competences		
Learning outcomes	Differentiate object-oriented programming with structured programming; Explain the benefits that object-oriented programming provides; Summary, explaining the contents of the object-oriented programming method; summarize the steps of analyzing and designing the program in the object-oriented; Perform object-oriented programming analysis and design; Create object-oriented programming in C/C ++.	
Contents	M1: C ++ programming language M2: Object-oriented programming methods M3: Object-oriented programming analysis and design M4: Class and object M5: Function overloading and operator overloading M6: Constructor and destructor M7: Inheritance M8: Dynamic polymorphism, virtual function	
Observations		
Teaching methodologies (include list)	Lecture, Demonstration, Problem solving, Show and tell, Work assignment, Practice.	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**

Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE28: System analysis and design

	Subject: System analysis and design	
Course		
ECTS	**6**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	Introduces an overview of system analysis and design. Provides basic skills in analyzing and designing an information system. Introduction of survey methods and specification requirements, from which system modeling with the specification chart. Based on that, proposes a new architecture, data, interfaces and systems.	
Contents	M1: Overview of System analysis and design M2: Situational survey and demand analysis M3: Object-oriented system analysis M4: object-oriented system design	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving	**10**	**100**

and / or exercises (with possibility of final exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE30: English 2

	Subject: English 2	
Course		
ECTS	**6ECTS**	
Character	**Mandatory**	
Semester	**4**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	English level required is B1 under EU frame or equivalent.	
Contents	M1: Good luck, bad luck M2: My favourite things *M3:* Memorable experiences M4: I love chocolate M5: How can I help?	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE31: Principles of operating systems

	Subject: Principles of operating systems	
Course		
ECTS	**6**	
Character	**Mandatory**	
Semester	**4**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences		
Transversal competences		
Learning outcomes	Learners can revisit the general principles of operating systems, compare the similarities and differences in the principles between typical operating system families. Performs installation of algorithms that simulate the operation of the operating system. Analyze and evaluate the pros and cons of algorithms and techniques in operating systems.	
Contents	M1: General introduction M2: Operating system structure M3: Process M4: Thread M5: Process synchronization M6: CPU scheduling M7: Deadlock M8: Main memory M9: Virtual memory M10: I/O management and disk scheduling M11: File management	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**

Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE32 : Computer networks

	Subject: Computer networks
Course	
ECTS	**6**
Character	**Mandatory**
Semester	**4**
Languages in which it is taught	**Vietnamese**
Basic and general competences	GC1. The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC3. Critical thinking GC6. Ability for self-study GC11. Skill in conducting trend analysis
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14. To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15. The ability to understand security demands and design and implement software/hardware security solutions SC16. Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC17. The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC21. Skill in analyzing and predicting trends in security aspects. SC22. Skill in analyzing anomalous code as malicious or benign. SC23. The ability to know, understand and apply binary analysis techniques and tools. SC24. Skill in performing damage assessments. SC25. Ability to evaluate risks (risk assessment) SC26. To design/establish security policies, privacy policies and standards SC29. Ability to describe and illustrate the risks, threats and solutions SC31. The ability to know, understand and apply database security techniques. SC32. The ability to know, understand and apply cloud computing security solutions.
Transversal competences	
Learning outcomes	- Introduce the basic knowledge about the architecture and principles of computer network; especially focus on the Internet architecture and the principles of Internet protocols. - Analyze packets of different protocol layers. - Design simple computer network using simulation tools - Install and configure some network devices

Contents	M1: Introduction to computer networks M2: Application layer M3: Transport layer M4: Network layer M5: Data link layer M6: Physical layer	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**37.5**	**28%**
Lab practices	**7.5**	**5.6%**
Evaluation semester		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE33: Detecting Security Bugs and Vulnerabilities in Software

	Subject: Detecting Security Bugs and Vulnerabilities in Software
Course	
ECTS	**4**
Character	**Mandatory**
Semester	
Languages in which it is taught	**Vietnamese**
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC2: Problem solving ability, design ability GC3: Critical thinking GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork) GC8: Ability to project organization and planning
Specific competences	SC13: Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15: The ability to understand security demands and design and implement software/hardware security solutions SC16: Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC17: The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC19: Skill in secure test plan design (e. g. unit, integration, system, acceptance) SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans. SC22. Skill in analysing anomalous code as malicious or benign. SC23. The ability to know, understand and apply binary analysis techniques and tools. SC26. To design/establish security policies, privacy policies and standards SC31: The ability to know, understand and apply database security techniques SC32: The ability to know, understand and apply cloud computing security solutions
Transversal competences	
Learning outcomes	Understanding the basics of information security in software development. Have the knowledge of the common security vulnerabilities in the program, understand the risk of attack can occur on the software, so that there are solutions to ensure the security of the software.

Contents	M1: Overview M2: General Safety Information M3: Buffer Overflows M4: Unvalidated Input M5: TAIN Analysis M6: The vulnerabilities in web programming M7: Vulnerabilities in mobile programming	
Observations		
Teaching methodologies (include list)	Presentations, Lab practices and Projects	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**22.5**	**25%**
Lab practices	**7.5**	**8.3%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE34: Algorithms and Complexity

	Subject: Algorithms and Complexity	
Course		
ECTS	**4**	
Character	**Mandatory**	
Semester	**4**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3. Critical thinking GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study	
Specific competences	SC15. The ability to understand security demands and design and implement software/hardware security solutions SC18. The ability to know, understand and apply security event correlation techniques and tools. SC25. Ability to evaluate risks (risk assessment)	
Transversal competences		
Learning outcomes	Understand the definition of algorithms complexity Ability of evaluating the complexity of some algorithms Understanding the definition of NP complete, NP hard problems	
Contents	M1: Introduction to algorithms and complexity M2: The complexity of some algorithms M3: NP-complete & NP-hard	
Observations		
Teaching methodologies (include list)	Presentations, practice exercises, discussions	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE35: Web Application Development

	Subject: Web Application Development	
Course		
ECTS	**6**	
Character	**Mandatory**	
Semester		
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2. Problem solving ability, design ability GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences	SC17. The ability to know, understand and apply code analysis techniques.	
Transversal competences		
Learning outcomes	To understand the concept of Web Application Development To understand the Essentials of Web Application Development. To understand the differences between client side & server side technologies to develop Web Application To understand and practice web page with HTML, CSS, JavaScript for Front-end.	
Contents	M1: Overview the Internet and WWW M2: HyperText Markup Language (HTML) M3: Cascading Style Sheets (CSS) M4 : JavaScript for Front-end M5: The Document Object Model (DOM) M6: Front-end Frameworks	
Observations		
Teaching methodologies (include list)	Combine teaching theory with practice	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final	**10**	**100**

exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE36: Java Programming

	Subject: Java Programming	
Course		
ECTS	**6**	
Character	**Optional**	
Semester	**1**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1. The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork) GC10. Representation skill: Ability to represent, illustrate, convince	
Specific competences	SC15. The ability to understand security demands and design and implement software/hardware security solutions SC17. The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC22. Skill in analysing anomalous code as malicious or benign.	
Transversal competences		
Learning outcomes	Understand basic knowledge and skills in Java programming Ability of applying to build Java desktop application	
Contents	M1: Overview of Java programming language M2: The basic programming structures in Java M3: Classes and Objects M4: Object-oriented features in Java M5: Streams and files M6: Programming with database M7: Designing user interfaces	
Observations		
Teaching methodologies (include list)	Presentations, Lab practices and Projects	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with	**10**	**100**

possibility of final exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE37: Computer network design

	Computer network design	
Course		
ECTS	**6**	
Character	**Optional**	
Semester	**4**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2. Problem solving ability, design ability GC5. Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences	SC15. The ability to understand security demands and design and implement software/hardware security solutions SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans.	
Transversal competences		
Learning outcomes	• Knowledge: students can classify network types, network devices by the functional, maker, design and configuration method. • Technique: Design different network types; Configure Cisco's switches and routers. • Others: Cooperation in group; Working independent or collaborative.	
Contents	M1: Identify the needs and objectives of clients M2: Logical network design M3: Physical network design M4: Testing, Optimization, Writing Network design documentation	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE38: English for ICT studies

	Subject: English for ICT studies	
Course		
ECTS	**4ECTS**	
Character	**Mandatory**	
Semester	**5**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork)	
Specific competences		
Transversal competences		
Learning outcomes	Read and understand the main ideas of a report or materials related to IT, using English to express and handle some common professional situations; Ability to write simple reports, present opinions related to professional work.	
Contents	M1: ICT in the workplace M2: Introduction to ICT systems M3: ICT in education M4: The Internet M5: Software development	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE39: Ho Chi Minh Idcology

	Subject: Ho Chi Minh Idcology

Course		
ECTS	**4ECTS**	
Character	**Mandatory**	
Semester	**5**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3. Critical thinking GC6. Ability for self-study GC10. Representation skill: Ability to represent, illustrate, convince	
Specific competences		
Transversal competences		
Learning outcomes	Students can apply knowledge of social science and humanities to career and life.	
Contents	M1: Establishment, formation and development of Ho Chi Minh ideology M2: Ho Chi Minh's thoughts on national issues and the revolution of national liberation M3: Ho Chi Minh ideology of socialism and the transitional road to socialism in Vietnam M4: Ho Chi Minh ideology of the Communist Party of Vietnam M5: Ho Chi Minh's thoughts on the great national unity and international unity M6: Ho Chi Minh's idea of building the state of the people, by the people, for the people M7: Ho Chi Minh's thoughts on culture, morality and building new people	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final	**10**	**100**

exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE40: Modeling and Control

	Subject: Modeling and Control

Course		
ECTS	**4**	
Character	Mandatory	
Semester	**5**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1. The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC3. Critical thinking GC6. Ability for self-study	
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC17. The ability to know, understand and apply code analysis techniques. SC21. Skill in analysing and predicting trends in security aspects. SC22. Skill in analysing anomalous code as malicious or benign. SC26. To design/establish security policies, privacy policies and standards	
Transversal competences		
Learning outcomes	Students can collect, analyze and process data to build simulation model of an automated control system.	
Contents	M1: The Basics of System Modelling M2: System model M3: Simulation method M4: Computer methods for modelling automated control systems M5: Continuous system simulation M6: Modelling of random systems M7: Simulate the queue system M8: Application Ident Tool in matlab to build a modelling automated control system	
Observations		
Teaching methodologies (include list)	Presenting on theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**22.5**	**25%**
Lab practices	**7.5**	**8.3%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with	**10**	**100**

possibility of final exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE41: Information security

	Information security
Course	

ECTS	**4**	
Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork) GC8: Ability to project organization and planning GC9: Time management skill	
Specific competences	SC23. The ability to know, understand and apply binary analysis techniques and tools.	
Transversal competences		
Learning outcomes	Introduces an overview of information security. Provides basic principles and primitives in information security.	
Contents	M1: Overview of Information security M2: Confidentiality M3: Integrity M4: Trust	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE42: Cryptology and Applications

	Subject: Cryptology and Applications
Course	

ECTS	**6**	
Character	Mandatory	
Semester		
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2. Problem solving ability, design ability GC4. Creativity and Reactivity GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study	
Specific competences	SC15. The ability to understand security demands and design and implement software/hardware security solutions SC17. The ability to know, understand and apply code analysis techniques. SC21. Skill in analysing and predicting trends in security aspects. SC22. Skill in analysing anomalous code as malicious or benign. SC25. Ability to evaluate risks (risk assessment) SC26. To design/establish security policies, privacy policies and standards SC31. The ability to know, understand and apply database security techniques.	
Transversal competences		
Learning outcomes	Students understand the principles of a symmetric key system and the public and application cryptosystems. Analyze and compare the fundamental differences between the symmetric cryptosystem and the public cryptosystem. Students know how to distribute key to cryptosystem. Understand the principles of capturing and storing security keys, security protocols	
Contents	M1: General introduction M2: Full secret encryption M3: Symmetric encryption M4: Message authentication code M4: Hash functions and applications M5: Build symmetric code in reality M6: Key management M7: Public encryption M8: Electronic Signature	
Observations		
Teaching methodologies (include list)	Presenting on theory Guiding classroom discussions	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	
Sistemas de evaluación		

Denomination of the evaluation system	Minimum weighting (%)	Maximum weighting (%)
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	10	100
Practical tests (with possibility of final exam)	10	100
Evaluation of work and activities	10	100

UE43: Linux and Open – source software

	Subject: Linux and Open – source software
Course	
ECTS	6

Character	Mandatory	
Semester	**5**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2. Problem solving ability, design ability GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study	
Specific competences	SC15. The ability to understand security demands and design and implement software/hardware security solutions	
Transversal competences		
Learning outcomes	Understand the basic knowledge of open - source software and Linux operating system Ability to use PHP and MySQL to develop applications in practice	
Contents	M1: Introduction of open source software M2: Introduction to Linux operating system M3: Exploiting open source software M4: Building and developing open source software	
Observations		
Teaching methodologies	Lecturing, demonstration, work assignment, practice	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE44: Back-end web development

	Subject: Back-end web development
Course	
ECTS	**6**

Character	**Mandatory**	
Semester	**3**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences	SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans.	
Transversal competences		
Learning outcomes	Introduces an overview of Back-end web development. Provides basic skills in analyzing and designing a Back-end web system.	
Contents	M1: Overview of Web server and web back-end application M2: Statefull and stateless architectures M3: Asynchronous and parallel in HTTP Request processing M4: Working with Database management systems M5: Challenges in building a big web back-end development	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE45: Network adminnistration

	Subject: Network adminnistration
Course	
ECTS	**6**
Character	**Optional**
Semester	**4**

Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC2: Problem solving ability, design ability GC3: Critical thinking GC4: Creativity and Reactivity GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork) GC8: Ability to project organization and planning GC9: Time management skill GC10: Representation skill: Ability to represent, illustrate, convince GC11: Skill in conducting trend analysis	
Specific competences		
Transversal competences		
Learning outcomes	Identify user requirements before deploying the network. Determine specific services for each system. Explain the need to use group policy and network security Deploy basic services such as DNS, DHCP, IP address configuration Apply group policy to deploy software, and increase network security using Windows operating systems.	
Contents	M1: Windows Server 2012: Introduction, Install and Configuration M2: Active Directory Domain Services M3: IPv4 M4: Dynamic Host Configuration Protocol M5: Domain Name System M6: IPv6 M7: Group Policy and security configuration	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Evaluation semester		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE46: Revolutionary guideline of Vietnamese Communist Party

	Subject: Revolutionary guideline of Vietnamese Communist Party
Course	
ECTS	**6ECTS**

Character	**Mandatory**	
Semester	**6**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3. Critical thinking GC6. Ability for self-study GC10. Representation skill: Ability to represent, illustrate, convince	
Specific competences		
Transversal competences		
Learning outcomes	Students can apply knowledge of social science and humanities to career and life.	
Contents	M1: The birth of the Communist Party of Vietnam and the first political program of the Party M2: The way to fight the government of 1930-1945 M3: The Resistance colonialism and the Great American invasion M4: Industrialization M5: The way to a market economy oriented socialist M6: The way to build the political system	
Observations		
Teaching methodologies (include list)	Lecturing	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**45**	**33.3%**
Lab practices	**0**	**0**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises	**10**	**100**
Practical tests	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE47: Environmental Management

UE48: Economics of Trade and Services

	Subject: Environmental Management	
Course		
ECTS	**4ECTS**	
Character	**Mandatory**	
Semester	6	
Languages in which it is taught	Vietnamese	
Basic and general competences	GC2. Problem solving ability, design ability GC6. Ability for self-study GC8. Ability to project organization and planning	
Specific competences		
Transversal competences		
Learning outcomes	Present basic knowledge on environmental protection	
Contents	M1: Basic issues of environmental management M2: The basis of environmental management M3: Tools in environmental management M4: State management system for environmental protection and environmental inspection M5: Environmental management of urban and industrial zones M6: Environmental management of rural and craft villages	
Observations		
Teaching methodologies (include list)	Presenting on theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Evaluation systems		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

	Subject: Economics of Trade and Services	
Course		
ECTS	**4ECTS**	
Character	**Mandatory**	
Semester	6	
Languages in which it is taught	Vietnamese	
Basic and general competences	GC2. Problem solving ability, design ability GC6. Ability for self-study GC8. Ability to project organization and planning	
Specific competences		
Transversal competences		
Learning outcomes	Present basic knowledge on management, economics	
Contents	M1: General introduction of trade and services M2: Distribution system of goods and services M3: E- commerce M4: Economic services M5: Business services and integration	
Observations		
Teaching methodologies (include list)	Presenting on theory	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0**
Evaluation systems		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE49: Malware analysis

	Subject: Malware analysis
Course	
ECTS	**6**
Character	**Mandatory**
Semester	**6**
Languages in which it is taught	**Vietnamese**
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC2: Problem solving ability, design ability GC3: Critical thinking GC4: Creativity and Reactivity GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC8: Ability to project organization and planning
Specific competences	SC13: Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15: The ability to understand security demands and design and implement software/hardware security solutions. SC17: The ability to know, understand and apply code analysis techniques. SC20: Skill in developing, testing, and implementing network infrastructure contingency and recovery plans. SC21: Skill in analysing and predicting trends in security aspects. SC22: Skill in analysing anomalous code as malicious or benign. SC23: The ability to know, understand and apply binary analysis techniques and tools. SC24. Skill in performing damage assessments.
Transversal competences	
Learning outcomes	Understanding of malware on computing devices Understanding of defense measures Understanding of the tactics, techniques, and procedures to analyze malware Ability to develop application to tackle challenges due to malware
Contents	M1: Introduction to malware M2: Static analysis M3: Dynamic analysis M4: Malware analysis on portable devices
Observations	
Teaching methodologies (include list)	Lecture, Demonstration, Problem solving, Show and tell, Work assignment, Laboratory experiment.
Formation activities	

Denomination of the formative activity	Hours	Presence (%)
Plenary session and problem / exercise solving	15	16.7%
Lab practices	15	16.7%
Sistemas de evaluación		
Denomination of the evaluation system	Minimum weighting (%)	Maximum weighting (%)
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	10	100
Practical tests (with possibility of final exam)	10	100
Evaluation of work and activities	10	100

UE50: Strategic Security Management

	Subject: Strategic Security Management

Course		
ECTS	**4**	
Character	**Mandatory**	
Semester	**6**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	- GC6: Ability for self-study	
Specific competences	- SC13: Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. - SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. - SC16: Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. - SC19: Skill in secure test plan design (e. g. unit, integration, system, acceptance). - SC21: Skill in analysing and predicting trends in security aspects. - SC27: To make employees aware about corporate security policies and standards - SC28: To design, develop and report monitoring indicators according to policies and standards	
Transversal competences		
Learning outcomes	Introduces a number of national and international standards for information security and legal provisions on information security. Introduces the process of identifying and evaluating the safety risks of an information system. Set policies to keep the system operating safely and continuously.	
Contents	- M1: Introduction to Information Security Management System (ISMS) - M2: Risk Assessment in Information Security - M3: Setting up risk control measures - M4: Setting ISMS	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**33.3%**
Lab practices	**0**	**0%**
Sistemas de evaluación		
Denomination of	**Minimum weighting (%)**	**Maximum weighting (%)**

the evaluation system		
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE51: Information System Security Audit

	Subject: Information System Security Audit

Course		
ECTS	**4**	
Character	**Mandatory**	
Semester	**6**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC11: Skill in conducting trend analysis	
Specific competences	SC14: To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15: The ability to understand security demands and design and implement software/hardware security solutions	
Transversal competences		
Learning outcomes	Students can analysis risk management approaches for information system security audit corresponding to operation, objectives of organizations Students can evaluate logical, physical tests and automatic approaches in Information Systems Security	
Contents	M1: Overview of evaluate and verify information safety. M2: Information security risk management M3: ISO 27005 in information security assessment M4: Operating system verification M5: Network verification M6: Information security testing tools	
Observations		
Teaching methodologies (include list)	Presenting on theory Guiding classroom discussions	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**22.5**	**25%**
Lab practices	**7.5**	**8.3%**
Evaluation systems		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE52: Mobile Application Development

	Subject: Mobile Application Development	
Course		
ECTS	**6**	
Character	**Optional**	
Semester		
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC3: Critical thinking GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork) GC8: Ability to project organization and planning	
Specific competences	SC17: The ability to know, understand and apply code analysis techniques. SC19: Skill in secure test plan design (e. g. unit, integration, system, acceptance) SC31: The ability to know, understand and apply database security techniques SC32: The ability to know, understand and apply cloud computing security solutions	
Transversal competences		
Learning outcomes	Understand the basic features of the Mobile programming enviroment. Ability to compare the differences between Desktop or Web Applications. Gains a deeper understanding of the issues associated with developing moblile apps. Analysis and design a mobile application on object oriented; Installing applications and services on mobile devices; Know how to publish software applications for mobile devices.	
Contents	M1: Overview of Mobile App Development M2: Developing the Android App M3: Developing the iOS App	
Observations		
Teaching methodologies (include list)	Presentations, Lab practices and Projects	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and /	**10**	**100**

or exercises (with possibility of final exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE53 : Network security and operating systems

	Subject: Network security and operating systems
Course	

ECTS	**4**	
Character	**Mandatory**	
Semester	**6**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1: The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC5: Ability to apply theoretical knowledge to practice GC6: Ability for self-study GC7: Ability to work in a diversity group and in an international context (teamwork)	
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14. To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15. The ability to understand security demands and design and implement software/hardware security solutions SC16. Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance). SC21. Skill in analysing and predicting trends in security aspects. SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans.	
Transversal competences		
Learning outcomes	Introduces basic principles of network security and covers topics such as active and passive attacks on the network, encryption, symmetric and asymmetric key systems, authentication by certification bodies. and access control using passwords and firewalls.	
Contents	M1: Introduction to Network Security M2: Threats to communications networks M3: The role of encryption in network security M4: Perform encryption in network M5: Authentication and access control	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**

Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE54: Internship

	Subject: Internship
Course	

ECTS	**24**
Character	**Mandatory**
Semester	
Languages in which it is taught	**Vietnamese**
Basic and general competences	GC5: Ability to apply theoretical knowledge to practice GC7. Ability to work in a diversity group and in an international context (teamwork) GC6. Ability for self-study GC8. Ability to project organization and planning GC9. Time management skill
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14. To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the systems SC15. The ability to understand security demands and design and implement software/hardware security solutions SC16. Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC17. The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance). SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans. SC21. Skill in analysing and predicting trends in security aspect SC22. Skill in analysing anomalous code as malicious or benig SC23. The ability to know, understand and apply binary analysis techniques and tools. SC24. Skill in performing damage assessments. SC25. Ability to evaluate risks (risk assessment) SC26. To design/establish security policies, privacy policies and standards SC27. To make employees aware about corporate security policies and standards SC28. To design, develop and report monitoring indicators according to policies and standards SC29. Ability to describe and illustrate the risks, threats and solutions SC30. Skill in technical writing, reviewing and editing cyber-related Intelligence/assessment products from multiple sources. SC31. The ability to know, understand and apply database security techniques. SC32. The ability to know, understand and apply cloud computing security solutions.
Transversal competences	
Learning outcomes	Students practice at computer company or lab. On successful completion

	of this course students will be able to: • Analysis and design system; evaluate common data models (databases); Explain the principles and techniques of programming, how a program is executed on the computer; Elaborate methods of designing algorithms and data structures to build computer software. • Apply knowledge of software development process, software architecture, database management system to software development. • Explain the basics of encryption; Evaluate some methods and tools for monitoring, ensuring system security. Apply knowledge of safety ensuring to the development of IT systems. • Effective communication; Presentation, group discussion, good coordination with members when joining the IT development team involved in many fields. • Programming proficiency in at least one programming language, using at least one database management system; Building, installing, operating the IT system. • Apply some scientific and technical tools to monitor, analyze and solve problems related to ensuring safety and security of information systems of computers and networks; Designing, building and deploying applications that ensure security and information security. • Perform ethics and professional responsibility, personal responsibility and responsibility for the group, compliance with occupational safety principles. • Self-orientated, adapt to different working environments; Being aware of the necessity of self-learning, accumulation of knowledge and experience to improve the professional level to meet the job requirements.	
Contents	M1: Study overview of the problem and the company where interns are training. M2: Planning M3 : Requirements Discovery, Requirements analysis and Requirements Specification M4: Design Software/Find solutions to the Problem M5: Implementation M6: Software testing	
Observations		
Teaching methodologies (include list)	Students study under the guidance and supervision of the lecturer	
Formation activities		
Denomination of the	**Hours**	**Presence (%)**

formative activity		
Plenary session and problem / exercise solving	**0**	**0%**
Lab practices	**180**	**33.4%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE55: Web application security and testing

	Subject: Web application security and testing

Course		
ECTS	**6**	
Character	**Optional**	
Semester	**1**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC1. The ability to analyze systems, mechanisms and procedures related to protection of information entities and objects GC5. Ability to apply theoretical knowledge to practice GC6. Ability for self-study GC7. Ability to work in a diversity group and in an international context (teamwork) GC10. Representation skill: Ability to represent, illustrate, convince	
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14. To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the system. SC15. The ability to understand security demands and design and implement software/hardware security solutions SC17. The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance). SC25. Ability to evaluate risks (risk assessment) SC29. Ability to describe and illustrate the risks, threats and solutions SC31. The ability to know, understand and apply database security techniques.	
Transversal competences		
Learning outcomes	Understand methods, techniques, testing tools for web applications Understand web security, captures some common types of web attacks and prevention method. Ability of test planning, testcase writing, testing and analysis of results. Ability of using tools to support web vulnerabilities	
Contents	M1: Overview of web applications M2: Common web application testing methods M3: Some tools support web application testing M4: Web application security	
Observations		
Teaching methodologies (include list)	Presentations, Lab practices and Projects	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and	**30**	**22.2%**

problem / exercise solving		
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final exam)	**10**	**100**
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE56: Computer network monitoring

	Computer network monitoring
Course	
ECTS	**6**

Character	**Optional**	
Semester	**7**	
Languages in which it is taught	**Vietnamese**	
Basic and general competences	GC5. Ability to apply theoretical knowledge to practice GC6: Ability for self-study	
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC21. Skill in analysing and predicting trends in security aspects. SC22. Skill in analysing anomalous code as malicious or benign.	
Transversal competences		
Learning outcomes	• Knowledge: Identification of threats and harms to the computer network, monitoring methods and tools. • Technique: Use a number of command line tools and graphical tools to collect, detect and analyze the risk to the computer network. • Others: Cooperation in group; Working independent or collaborative.	
Contents	M1: Network Security Monitoring Rationale M2: Collecting Network Traffic: Access, Storage, and Management M 3: Stand-alone NSM Deployment and Installation M4: Distributed Deployment M5: OS Platform Housekeeping M6: Command Line Packet Analysis Tools M7: Graphical Packet Analysis Tools M8: NSM Consoles M 9: NSM Operations M 10: Server-side Compromise M11: Client-side Compromise M 12: Extending Security Onion M 13: Proxies and Checksums	
Observations		
Teaching methodologies (include list)	- Teaching theory - Doing homework - Discussion groups	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**30**	**22.2%**
Lab practices	**15**	**11.1%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and / or exercises (with possibility of final	**10**	**100**

exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**

UE57: Graduation Thesis

	Subject: Graduation Thesis
Course	
ECTS	**20**

Character	**Mandatory**
Semester	
Languages in which it is taught	**Vietnamese**
Basic and general competences	GC6. Ability for self-study GC8. Ability to project organization and planning GC9. Time management skill
Specific competences	SC13. Skill in conducting vulnerability scans, recognizing and categorizing vulnerabilities in security systems. SC14. To understand and to apply the up-to-date methods, tools, software and techniques to analyze risks, threats and protect the systems SC15. The ability to understand security demands and design and implement software/hardware security solutions SC16. Skill in determining how a security system should work (including its resilience and dependability capabilities) and how changes in conditions, operations, or the environment will affect these outcomes. SC17. The ability to know, understand and apply code analysis techniques. SC18. The ability to know, understand and apply security event correlation techniques and tools. SC19. Skill in secure test plan design (e. g. unit, integration, system, acceptance). SC20. Skill in developing, testing, and implementing network infrastructure contingency and recovery plans. SC21. Skill in analysing and predicting trends in security aspect SC22. Skill in analysing anomalous code as malicious or benig SC23. The ability to know, understand and apply binary analysis techniques and tools. SC24. Skill in performing damage assessments. SC25. Ability to evaluate risks (risk assessment) SC26. To design/establish security policies, privacy policies and standards SC27. To make employees aware about corporate security policies and standards SC28. To design, develop and report monitoring indicators according to policies and standards SC29. Ability to describe and illustrate the risks, threats and solutions SC30. Skill in technical writing, reviewing and editing cyber-related Intelligence/assessment products from multiple sources. SC31. The ability to know, understand and apply database security techniques. SC32. The ability to know, understand and apply cloud computing security solutions.
Transversal competences	
Learning outcomes	On successful completion of this course students will be able to: • Analysis and design system; evaluate common data models (databases); Explain the principles and techniques of programming, how a program is executed on the computer; Elaborate methods of

	designing algorithms and data structures to build computer software. • Apply knowledge of software development process, software architecture, database management system to software development. • Explain the basics of encryption; Evaluate some methods and tools for monitoring, ensuring system security. Apply knowledge of safety ensuring to the development of IT systems. • Programming proficiency in at least one programming language, using at least one database management system; Building, installing, operating the IT system. • Apply some scientific and technical tools to monitor, analyze and solve problems related to ensuring safety and security of information systems of computers and networks; Designing, building and deploying applications that ensure security and information security. • Perform ethics and professional responsibility, personal responsibility and responsibility for the group, compliance with occupational safety principles. • Self-orientated, adapt to different working environments; Being aware of the necessity of self-learning, accumulation of knowledge and experience to improve the professional level to meet the job requirements.	
Contents	M1: Study overview of the problem M2: Planning M3 : Requirements Discovery, Requirements analysis and Requirements Specification M4: Design Software/Find solutions to the Problem M5: Implementation M6: Software testing	
Observations		
Teaching methodologies (include list)	Students study under the guidance and supervision of the lecturer	
Formation activities		
Denomination of the formative activity	**Hours**	**Presence (%)**
Plenary session and problem / exercise solving	**0**	**0%**
Lab practices	**150**	**33.3%**
Sistemas de evaluación		
Denomination of the evaluation system	**Minimum weighting (%)**	**Maximum weighting (%)**
Development and objective tests, problem solving and /	**10**	**100**

or exercises (with possibility of final exam)		
Practical tests (with possibility of final exam)	**10**	**100**
Evaluation of work and activities	**10**	**100**