IS201 - Information system analysis and design

Module designation	**IS201 - Information system analysis and design** The module presents the concepts and methodologies for analyzing the design of an Information System (IS), its function, and human involvement in the IS to support production and business operations. Students are equipped with a solid understanding of how an IS operates, including its three main components: data (the static aspect of IS, further clarified in a prerequisite module named Database), business processing (the dynamic aspect), and interfaces, as well as the skills to analyze and design these components using both structured and object-oriented approaches. By completing assignments and projects, students can use their knowledge and skills to tackle real-world problems. Particularly, students will proficiently use various analysis and design tools, utilize programming languages to build an information system, and develop interpersonal skills such as communication and teamwork.
Semester(s) in which the module is taught	4
Person responsible for the module	Dr. Cao Thi Nhan, MSc. Nguyen Thi Kim Phung, MSc. Nguyen Dinh Loan Phuong, MSc. Duong Phi Long
Language	Vietnamese, English
Relation to curriculum	Specialization
Teaching methods	Lecture, lesson, assignment, project, seminar, examination.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 - Contact hours: Lecture: 45 hours, Lab: 30 hours - Self-study hours: 120 hours
Credit points	Number of credits: 4 (6.5 ECTS credits) - Lecture: 3 - Laboratory: 1
Required and recommended prerequisites for joining the module	Database, Object-oriented programming

		CLO	CLOs description		ILOs
Module objectives/intended learning outcomes		**G1**	- Understand and articulate fundamental concepts: information systems and the function of IS in the society, system analysis and design, method of IS analysis and design, system analysis and design processes.		ILO2 (2.2)
		G2	- Understand of how to determine and formulate problems (idea generation). - Understand of information system modeling (processing and data components), and interface design.		ILO3 (3.1, 3.2, 3.3)
		G3	- Apply skills in idea generation, design (modeling), and system development to solve a specific problem.		ILO4 (4.1, 4.2)
		G4	- Utilize teamwork skills.		ILO5 (5.1, 5.2, 5.3, 5.4, 5.5)

CLO	ILO	CLOs description	Competency level
G1.1	2.2	Understand and present fundamental concepts: system, information system, management system, system analysis and design, methods of IS analysis and design, roles...	K4
G2.1	3.1	Understand and determine the relevant data: current application environment, customer requirements, problem scope... Understand some basic criteria for selecting problems to solve (Select design requirements based on goals and surveyed information. Analyze design options. Evaluate priorities and select the most suitable design). Describe an IS problem with medium complexity.	S4
G2.2	3.2 3.3	- Establishing and modeling the system: • Structured approach: Data Flow Diagram (DFD), Entity Relationship Diagram (ERD), and Relational Data Model. • Object-oriented approach: Activity Diagram, Sequence Diagram, Class Diagram, and State Diagram.	S4
G3.1	4.1	- Apply skills in determining and articulating real-world problems: • Understand customer needs and define system objectives. Make a decision on balancing various objectives, functions, structure, and system costs • Determine the necessary functions, components, and architecture of the system. Decompose the system into detailed components and define the functions of these components.	S4

			Proposing technical solutions and technologies for the system. • Describe the business processes of the system, the roles of participants, and the relationships or sequences of these processes.	
	G3.2	4.1 4.2	- Apply modeling and design skills to solve real-world problems: • Modeling data components, processing components, and interfaces. • Using information system modeling tools (Power Designer/ MS Visio/ StarUML…) for the design process. - Programming interfaces for information systems that connect to databases. Understand and apply interface design techniques.	S4
	G4.1	5.1 5.2 5.3 5.4 5.5	- Establish goals and determine tasks. - Create a work schedule. - Apply teamwork principles. - Apply group communication rules. - Propose solutions. - Show a truly collaborative mindset. - Negotiate, come to agreements, and settle disputes.	S4
	(**Competency level**: K: Knowledge, S: Skill, A: Attitude)			

Content	**Theory**				
	Week/ Duration (4 hours)	**Content**	**CLOs**	**Assessment elements**	
	1	Chapter 1: Overview of Information System Analysis and Design Chapter 2: Requirement Determination and Analysis	G1.1, G2.1, G3.1	A3	
	2	Chapter 2: Requirement Determination and Analysis (next)	G2.1, G2.2, G3.1, G4.1	A3, A4	
	3, 4	Chapter 3: Analysis and design processing and data components in structured approach	G2.2, G3.2, G4.1	A1.1, A1.2	
	5, 6, 7, 8	Chapter 4: Analysis and design processing and data components in object-oriented approach	G2.2, G3.2, G4.1	A3, A4	
	9,10	Chapter 5: Design interface components	G3.2, G4.1	A3	
	11	Review			
	Lab				
	Week/ Duration (5 hours)	**Content**	**CLOs**	**Assessment elements**	
	1	- Introduce tools and technologies that support information system modeling: StarUML, Power Designer, MS Visio, Rational Rose… - Activities to assess the current situation, state the problem, determine functional and non-functional requirements, and apply to the project.	G2.2, G3.2, G4.1	A2.1, A3	
	2	- Exercises on designing use-case diagrams, use-case specification and apply them to the project. - Monitoring and providing feedback on the work of the groups.	G2.2, G3.2, G4.1	A2.2, A3	
	3	- Exercises on designing Activity diagrams and apply them to the project.	G2.2, G3.2, G4.1	A2.3, A3	
	4	- Exercises on designing Sequence diagrams and apply them to the project. - Design user interface and implement the program (Form, Report)	G2.2, G3.2, G4.1	A2.4, A2.5, A3	
	5	- Exercises on designing Class diagrams and apply them to final project. - Review and refine the diagrams for final project.	G2.2, G3.2, G4.1	A2.6, A3	
	6	- Exercises on designing State diagrams and apply them to final project. - Review and refine the diagrams for final project.	G3.2, G4.1	A2.7, A3	

Examination forms	Assessment elements	Details	CLOs	Percentage
	Practice	**A1. Theoretical assignments** A1.1 and A1.2: Structured analysis and design - A1.1 DFD model - A1.2 ERD model, transform ERD to Relational Data model (conceptual, and physical level). **A2. Practical assignments** - A2.1 Problem's survey - A2.2 Use-case diagrams, use-case specification - A2.3 Activity diagrams - A2.4 Sequence diagrams - A2.5 Design interfaces, programming - A2.6 Class diagrams - A2.7 State diagrams	G1, G2 G1, G2, G3, G4	50%
		A3. Final project Completely analysis and design an application by object-oriented approach with a relational database design, write a report and present a seminar. - State the problem statement and formulate Use-case diagram, Activity diagram, Sequence diagram, Class diagram, and State diagram. - Design interfaces, implement some key system functionalities.	G1, G2, G3, G4	
	Final theory examination	**A4. Final examination**	G2, G3	50%
Study and examination requirements		- Classroom and teamwork formation: Forming a group (maximum of 4 students), conducting group discussion, assigning tasks, creating a work plan for members to track progress, submitting a project report, and delivering a detailed presentation to the lecturer after the module ends (1-2 weeks later). - In-class and at home learning methods: Engaging in hands-on activities and problem-solving during class, as well as completing assignments and module projects at home. - Module's rules: Attendance policy: Full attendance is required (students who are absent for more than 5 lectures will be prohibited from taking the theoretical exam, and those absent for 3 lectures will not receive attendance points).		

Reading list	[1] Cao Thị Nhạn, Nguyễn Đình Loan Phương, 2020, Textbook of Information System Analysis and Design, National University Ho Chi Minh city publishing house. [2] Gary B. Shelly, and Harry J. Rosenblatt, 2013, Systems analysis and design, 10th edition, United States of America. [3] Kenneth E. Kendall, and Julie E. Kendall, 2014, Systems analysis and design, 9th edition, Prentice Hall. [4] Alan Dennis, Babara Haley Wixom, David Tegarden, Systems Analysis and Design: An Object-Oriented Approach with UML, 5th Edition, Wiley, 2015.