COURSE SYLLABUS

OBJECT-ORIENTED SOFTWARE DEVELOPMENT

Course code: 220068

1. General information

Course type	*Number of credits*	*Number of learning periods*
General □ Basic □ Specialized ☑	Theory: 02 Exercise: 00 Practice: 01	Theory: 30 Exercise: 00 Practice: 30
Required ☑ Elective □		

***Learners*:**

Level	Bachelor
Discipline	Information Technology

Course requirements:

Prerequisites	Software Engineering
Parallels	None
Other requirements	None

2. Learning resources:

Books	[1] Lethbridge, T. C., & Laganière, R (2004). *Object-Oriented Software Engineering: Practical Software Development using UML and Java*. McGraw Hill
References	[2] Nguyễn Văn Ba (2005). *Phát triển ứng dụng hướng đối tượng với UML và C++*. NXB Đại học Quốc gia [3] Britton, C., & Doake, J. (2004). *A student guide to object-oriented development*. Elsevier.

Other learning materials	[4] IBM Rational Rose Enterprise Software

3. Course description

The course provides students specialized knowledge of object-oriented software development (processes, methods, tools, and environment). The course also aims to teach students skills of using UML and CASE tool for modeling. Additionally, the course develops students’ appropriate awareness and attitudes on concept formation, approaches to different methods in software development, as well as to realize the advantages of object-oriented methods, and teamwork skills, public speaking skills.

4. Course learning outcomes (CLOs)

After finishing the course, students will be able to:

		Satisfy LOs of the program	***Satisfy LOs of the ABET***
❖ Topic 1: Disciplinary Knowledge and Reasoning			***B.1.1*** ***B.1.2*** ***B.1.4*** ***B.1.5*** ***B.1.6***
L1.	Describe characteristics of software and software engineering; software classification; outlining challenges of software engineering.	1.2.2, 1.3.1	
L2.	Explain object-oriented concepts; highlight the advantages of the object-oriented approach		
L3.	Describe characteristics of reuse-based software engineering		
L4.	Develop and analyze user requirements, defining actor and use case, and specify use case scenario using the activity diagram.		
L5.	Data modeling using class diagram		
L6.	Using design patterns to design and assign responsibilities for classes		
L7.	User-centered design and user interface design		

L8.	Modeling interactions and behavior using Collaboration diagram and State diagram		
L9.	Describe the processing of software testing and quality assurance		
❖ ***Topic 2: Personal and Professional Skills and Attributes***			
L10.	Problem Identification and Formulation	2.1.1	
L11.	Modeling	2.1.2	
❖ ***Topic 3: Interpersonal Skills: Teamwork and Communication***			
L12.	Forming Effective Teams	3.1.1	
L13.	Technical and Multidisciplinary Teaming	3.1.5	
❖ ***Topic 4: Conceiving, Designing, Implementing and Operating Systems in The Enterprise, Societal and Environmental Context – The Innovation Process***			
L14.	Understanding Needs and Setting Goals	4.2.1	
L15.	Defining Function, Concept and Architecture	4.2.2	
L16.	Utilization of Knowledge in Design	4.3.3	
L17.	Design System Components	4.3.4	
L18.	Realizing the system based on the designing	4.4.2	
L19.	Verify system requirements	4.5.1	

5. Course content

Course content	***CLOs***	***Number of learning periods***		
		Theory	***Practice***	***Others***
Chapter 1. Describe characteristics of software and software engineering; software classification; outlining challenges of software engineering.	***L1***	**3**	**0**	

1.1. What is software engineering? 1.2. Stakeholders software engineering 1.3. Software quality 1.4. Software engineering project 1.5. Main activities in software projects 1.6. Difficulties and Risks in Software Engineering				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			
☑ ***CDIO in the enterprise, societal and environmental context***	L14(T)			
Chapter 2. Explain object-oriented concepts; highlight the advantages of the object-oriented approach	***L2, L11, L12***	**3**	**0**	
2.1. What is object-oriented? 2.2. Classes and objects 2.3. Methods and polymorphism 2.4. Organize classes into Class inheritance 2.5. Difficulties and risks in language selection and object-oriented programming				

☑ ***Personal and Professional Skills and Attributes***	L10(T)
	L11(T)			

☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			
☑ ***CDIO in the enterprise, societal and environmental context***	L14(T)			
Chapter 3. Characteristics of reuse-based software engineering	***L3, L11,L12***	**3**	**0**	
3.1.Reuse: building on the work and experience of others 3.2.Frameworks: reusable subsystems 3.3.The client-server 3.4.Technology needed to build client-server systems 3.5.Object Client – Server Framework (OCSF)				

3.6.OCSF-client side 3.7.OCSF-server-side 3.8.An instant messaging application using the OCSF 3.9.Difficulties and risks when considering reusable technology and client-server systems				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			
☑ ***CDIO in the enterprise, societal and environmental context***	L14(T)			
Chapter 4. Develop and analyze user requirements, defining actor and use case, and specify use case scenario using the activity diagram.	***L4, L10, L11,L12, L14***	**4**	**5**	
4.1. Domain analysis 4.2. The starting point for software projects 4.3. Defining the problem and the scope 4.4. What is a requirement? 4.5. Types of requirements 4.6. Use cases: describing how the user will use the system 4.7. Some techniques for gathering requirements 4.8. Reviewing requirements 4.9. Managing changing requirements 4.10. Difficulties and risks in domain and requirements analysis				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			

☑ ***CDIO in the enterprise, societal and environmental context***	L16(T)
	L18(T)			

Chapter 5. Data modeling using class diagram	***L5, L10, L11,L12, L13***	**5**	**10**	
5.1.What is UML 5.2.Essentials of UML class diagrams				

5.3.Associations and multiplicity 5.4.Generalization 5.5.Object diagrams 5.6.Class diagram examples 5.7.The process of developing class diagrams 5.8.Difficulties and risks when creating class diagrams				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			

☑ ***CDIO in the enterprise, societal and environmental context***	L16(T)
	L18(T)			

Chapter 6. Using design patterns to design and assign responsibilities for classes	***L6, L10, L11, L12, L13***	**3**	**0**	
6.1. Introduction to patterns 6.2. The Abstraction–Occurrence pattern 6.3. The General Hierarchy pattern 6.4. The Player–Role pattern 6.5. The Singleton pattern 6.6. The Observer pattern 6.7. The Delegation pattern 6.8. The Adapter pattern 6.9. The Façade pattern 6.10. The Immutable pattern 6.11. The Read-Only Interface pattern 6.12. The Proxy pattern 6.13. The Factory pattern 6.14. Enhancing OCSF to employ additional design patterns 6.15. Difficulties and risks when using design patterns				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			

☑ ***CDIO in the enterprise, societal and environmental context***	L16(T)
	L18(T)			

Chapter 7. User-centered design and user interface design	***L7, L10, L11, L12, L13, L15, L16***	**3**	**5**	
7.1. User-centered design 7.2. Characteristics of users 7.3. The basics of user interface design 7.4. Usability principles 7.5. Evaluating user interfaces 7.6. Difficulties and risks in user-centered design				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			

☑ ***CDIO in the enterprise, societal and environmental context***	L16(T)
	L18(T)			

Chapter 8. Modeling interactions and behavior using Collaboration diagram and State diagram	***L8, L10, L11, L12, L13, L15, L16, L17, L18***	**3**	**10**	
8.1. Interaction diagrams 8.2. State diagrams 8.3. Activity diagrams 8.4. Difficulties and risks in modeling interactions and behavior				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			

☑ ***CDIO in the enterprise, societal and environmental context***	L16(T)
	L17(T)
	L18(T)			

Chapter 9. Describe the processing of software testing and quality assurance	***L9, L19***	**3**	**0**	

9.1. Basic definitions 9.2. Effective and efficient testing 9.3. Defects in ordinary algorithms 9.4. Defects in numerical algorithms 9.5. Defects in timing and co-ordination: deadlocks, livelocks and critical races 9.6. Documentation defects 9.7. Writing formal test cases and test plans 9.8. Strategies for testing large systems 9.9. Inspections 9.10. Quality assurance in general 9.11. Test cases for phase 2 of the SimpleChat instant messaging system				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			
☑ ***CDIO in the enterprise, societal and environmental context***	L19(T)			
Summary of skills in course level				
☑ ***Personal and Professional Skills and Attributes***	L10(T)			
☑ ***Interpersonal Skills: Teamwork and Communication***	L12(U)			

☑ ***CDIO in the enterprise, societal and environmental context***	L16(T)
	L17(T)
	L18(T)			

6. Teaching and learning methods

ID	Teaching method/technique		Description
M1.	Lecturing	☑	
M2.	Questions – Answers	□	
M3.	Group-based Learning	□	
M4.	Problem-based Learning	□	

ID	Teaching method/technique		Description
M5.	Project-based Learning	□	
M6.	Case studies	☑	
M7.	Roleplay	□	
M8.	Demo	□	
M9.	Simulations	☑	
M10.	Debate	□	
M11.	Game	□	
M12.	Brainstorming	□	
M13.	Think-Pair-Share	□	

7. Course assessment

ID	Assessment activity		Quantity	Weight	LOs assessed
T1.	Text-based midterm exam	□			
T2.	Text-based final exam	□			
T3.	Practice midterm exam	☑		*25%*	*L4, L5,L6, L7, L8*
T4.	Practice final exam	□			
T5.	Report	□			
T6.	In-class exercises	☑		*25%*	*L5, L7, L8*
T7.	Homework assignments	□			
T8.	Question – Answer	□			
T9.	Term Project	☑		50%	*L4 - L9*
T10.	Final Exam	□			
Formula for Overall score	**T3*0.25+T6*0.25+T9*0.5**				

8. Course requirements and expectations

8.1. Requirements on attendance

- Students are responsible for attending in all classes. In case of absence due to force majeure circumstances, there must be sufficient and reasonable evidence.
- Students who do not attend more than 20% of the class sections, whether for reason or not, are deemed not to have completed the course and must re-enroll in the following semester.

8.2. Requirements and expectations on student behaviors

- Students must show their respects for teachers and other learners.
- Students must be on time. Students who are late more than five minutes will not be allowed to attend the class.
- Students should not make noise and interfere with others in the learning process.
- Students should not eat, chew gum, and use devices such as cell phones, music players during class hours.
- Laptops and tablets can only be used in class for the purpose of learning.
- Students who violate the above principles will be asked to leave the class and considered absent from the class.

8.3. Requirements on learning issues

Issues related to applying for score reservation, scoring complaints, scoring, exam disciplines are done according to the Learning Regulation of Tra Vinh University.

9. Tentative course instructor:

Nhan Minh Phuc

DEAN	DEPARTMENT HEAD	LECTURER
		Nhan Minh Phuc