COURSE DESCRIPTION

1. Information about the programme

1.1 Institution of higher education	**Alexandru Ioan Cuza University of Iasi**
1.2 Faculty	**Faculty of Economics and Business Administration**
1.3 Department	**Department of Accounting, Information Systems and Statistics**
1.4 Field of study	**Business Informatics**
1.5 Level	**Master**
1.6 Study programme/ Qualification	**Software Development and Business Information Systems**

2. Information about the course

2.1 Course name	**Object Oriented Analysis and Design**						
2.2 Course coordinator	**Conf. Sabina-Cristiana Necula, Ph.D.**						
2.3 Seminar coordinator	**Conf. Sabina-Cristiana Necula, Ph.D.**						
2.4 Year of study	I	2.5 Semester	I	2.6 Type of assessment	EVP	2.7 Discipline status	**C**

* *C – Compulsory / E - Elective*

3. Total estimated time (hours allocated to didactic activity per semester)

3.1 Total number of hours per week	3	of which: 3.2 lecture	2	3.3 seminar/lab	1
3.4 Total number of hours in the curriculum	42	of which: 3.5 lecture	28	3.6 seminar/lab	14

Time distribution	hours
Study of the handbook, coursebook, bibliography and notes	32
Additional research in the library, online and on the field	20
Preparation of seminars/labs, homeworks and projects	43
Tutorials	5
Assessment	8
Other activities.....	

3.7 Total number of self-study hours	108
3.9 Total number of hours per semester	150
3. 10 Number of credits	6

4. Prerequisites (if applicable)

4.1 curriculum-based	• Not applicable
4.2 competence-based	• Object-oriented programming, Analysis and design of informational systems

5. Conditions (if applicable)

5.1. for lectures	• Lecture rooms shall be provided with video projector • Students must attend 90% of lectures. • When required, homework have to be published before the lecture
5.2. for seminars/labs	• The IT department will ensure proper install of the required software modelling tool • Students are invited to bring and use their own laptops; • Labs will have enough computers for students not owning a laptop • Enterprise Architect, jdk 21, Intellij IDEA

6. Assimilated specific competences

Professional competences	• C1.1 Knowledge about tools, techniques and methods of analysis, design, implementation and testing of business information systems (1.5 credits) • C1.3 Combine and adapt the tools, methods and techniques for analysis, design and testing of information systems based on functional and technological requirements of the system (0.5 credits) • C1.5 Development of analysis, design, implementation and testing of an information system based on real-world case studies and compare various solutions (1 credit) • C3.4 Develop detailed architectural and technical solutions to be implemented, in terms of layers, modules and services, according to system requirements (1 credit) • C4.2 Identification of technically and economically feasible solutions for data, applications and services integration using existing methodologies and tools (1 credit)
Transversal competences	• CT1 – The ability to communicate and collaborate in teams of different professionals (0.5 credits) • CT2 – The ability to coordinate project teams and manage informational projects (0.5 credits)

7. Discipline objectives (provided by the assimilated specific competences grid)

7.1 The general objective of the discipline	• To apply effectively the object oriented paradigm in the design of information systems components
7.2 Specific objectives	• Understand the role of models in software development • Use analytical reasoning to translate user requirements to software components • Understand different design patterns and their specific usage • Model software components using UML tools • Organize effectively and communicate software design

8. Content

8. 1 Lecture	Teaching methods	Observations
Introduction to Object Oriented Analysis and Design	Interactive course, lecture	1 hour, [1,4,6,7]
Business process and functional modeling	Interactive course, problem solving method	4 hours, [1,2,4]
Structural modeling	Interactive course, problem solving method	4 hours, [1,2,6]
Behavioral modeling	Interactive course, problem solving method	4 hours, [1,2,6]
Software Architecture and UML Diagrams	Interactive course, lecture	2 hours, [1,2,45
Elements of Object Oriented Design	Lecture	2 hours, [2,3]
Introduction to Design patterns	Lecture	1 hour, [2,3]
Creational Design Patterns	Interactive course, problem solving method	4 hours, [2,3,5]
Structural Design Patterns	Interactive course, problem solving method	3 hours, [2,3,5]
Behavioral Design Patterns	Interactive course, problem solving method	3 hours, [2,3,5]

Bibliography

[1] Dennis, Alan, Barbara Wixom, David Tegarden. Systems Analysis and Design: An Object Oriented Approach with UML, 5th Edition. Wiley, 2015

[2] Larman, Craig, Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, Third Edition, Addison Wesley Professional, 2004, ISBN: 0-13-148906-2

Supplimentary:

Brown, W. H., Malveau, R. C., & Mowbray, T. J. (1998). AntiPatterns: refactoring software, architectures, and projects in crisis.

Erikson, H.E., Penker, M., (2000). Business Modeling with UML, Wiley Computer Publishing

Gamma, E., Helm, R., Johnson, R., & Vlissides, J. (1994). Design patterns: elements of reusable objectoriented software. Pearson Education.

Lethbridge, C.L., Laganiere, R. (2001). Object-Oriented Software Engineering, McGraw Hill
Schach, S.R. (2002). Object-Oriented and Classical Software Engineering, McGraw Hill
During the semester other references could be provided through the Portal FEAA.

8. 2 Seminar/lab	Teaching methods	Observations
Requirements identification	Teamwork, study case	1 hour
Functional modeling with UML	Teamwork, study case	2 hours
Structural and behavior modeling with UML	Teamwork, study case	3 hours
First assesment	Project evaluation and presentation	2 hours
Project refactoring with creational patterns	Teamwork, study case	2 hours
Project refactoring with structural patterns	Teamwork, study case	1 hour
Project refactoring with behavioral patterns	Teamwork, study case	1 hour
Second assesment	Project evaluation and presentation	2 hours

Bibliography

Dumitriu, F., Cretu, L.G., Necula, S., Olaru, G.M., Darii, A., Macovei, R., Model de studiu de caz, 2018, format electronic
Brown, W. H., Malveau, R. C., & Mowbray, T. J. (1998). AntiPatterns: refactoring software, architectures, and projects in crisis.
Erikson, H.E., Penker, M., (2000). Business Modeling with UML, Wiley Computer Publishing
Gamma, E., Helm, R., Johnson, R., & Vlissides, J. (1994). Design patterns: elements of reusable object oriented software. Pearson Education.
Lethbridge, C.L., Laganiere, R. (2001). Object-Oriented Software Engineering, McGraw Hill
Schach, S.R. (2002). Object-Oriented and Classical Software Engineering, McGraw Hill.

9. Corroboration of the discipline content with the expectations of epistemic community representatives, professional associations as well as of representative employers in the programme related field.

The content is in-line with similar courses at top universities such as Open University, as well as with the recommendations of AIS, ACM and IEEE (SWEBOOK). Also, the content is based on the best and newest practicies in software development industry and the content of laboratory activities has been carried out with the help of IT employers' representatives.

10. Assessment

Type of activity	10.1 Assessment criteria	10.2 Assessment methods	10.3 Share of final grade
Course	Part 1 – UML and OOD (chapters 1 – 5)	Test	30%
Course	Part 2 – Design patterns (chapters 6 – 10)	Test	20%
Lab	System modeling with UML	Project presentation and evaluation	30%
Lab	Design patterns	Project presentation and evaluation	20%
10.6 Minimum performance standard			

: the weighted average of the two exam tests (TP1 and TP2) should be at least 5; the wighted average of the two project assessments (P1 and P2) should be at least 5.

The final grade is computed as: TP1*0.3 + TP2*0.2 + P1*0.3 + P2*0.2

The 2 written tests will be held during the course hours, on the following dates:
• TP1 (chapters 1 – 5 from the analytical syllabus) – week 8;
• TP2 (chapters 6 - 10 from the analytical syllabus) - week 13;
• Re-evaluation TP1 and/or TP2 - week 14.
The project assessment will be done separately in 2 parts, on the following dates:
• Part I – System modeling using UML (chapters 1 – 5 from the project plan presented below) - week 7/8;
• Part II - Design patterns (chapter 6 from the project plan presented below) - week 14.
Intermediate deadlines for project presentation and discussion:
• week 3/4 – Chapter 1;
• week 5/6 – Chapters 2, 3, and 4;
• week 11/12 – formulation of the context/problems for applying design patterns.

Date of completion 26.09.2023	Lecture Coordinator Assoc. Prof. Sabina-Cristiana Necula, Ph. D.	Seminar Coordinators Assoc. Prof. Sabina-Cristiana Necula, Ph. D.
Date of approval within the department		Head of Department Prof. Mircea Asandului, Ph.D.