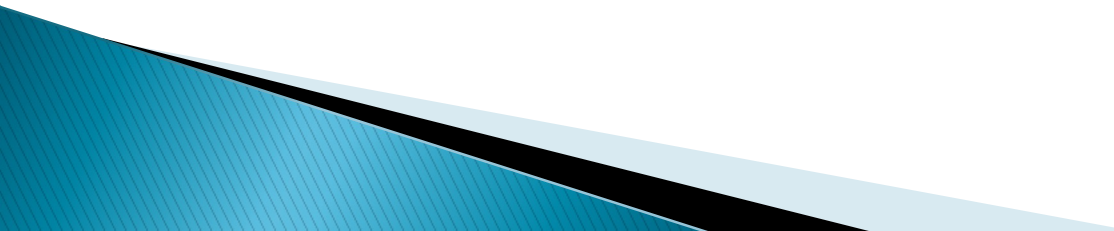


Advanced Software Engineering Techniques


Introduction – 30 September 2025

Adrian Iftene
adiftene@gmail.com, adiftene@info.uaic.ro

Content

- ▶ Courses
 - ▶ Labs
 - ▶ Project
 - ▶ Exam
 - ▶ Companies presentations
 - ▶ Achieving grades
 - ▶ Communication protocol
 - ▶ Bibliography
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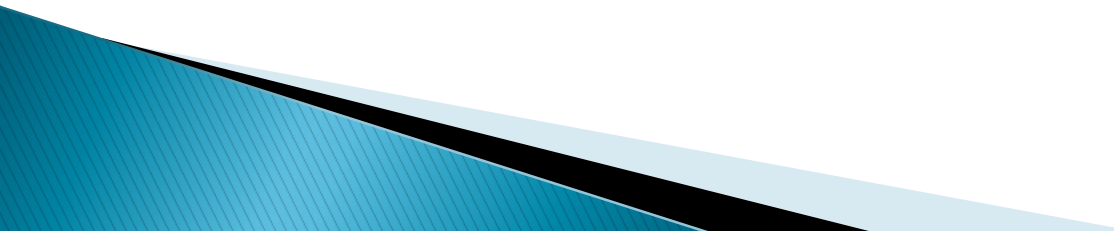
SE Content (What you should know ...)

- ▶ Software engineering
 - ▶ Developing models
 - ▶ Requirements identification
 - ▶ UML diagrams
 - ▶ SOLID, Design patterns
 - ▶ Testing and debugging
 - ▶ Maintenance
 - ▶ Software metrics
 - ▶ Project management
 - ▶ Author rights
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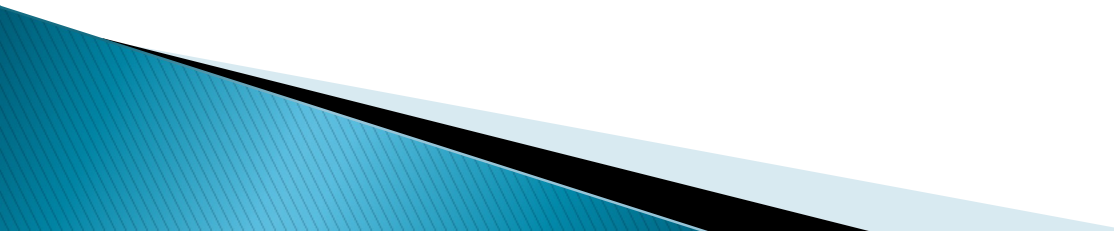
ASET Content (1)

- ▶ Object-oriented design: GRASP and medium level: GOF, high level: architectural styles (templates), SOA, object-oriented design principles
- ▶ Development and maintenance of the systems: model driven agile development, domain driven design, test driven development, refactoring
- ▶ Modeling, business modeling: BPMN, domain specific languages (DSL) frameworks: Eclipse Modeling Framework, Open Architecture Ware (OAW)

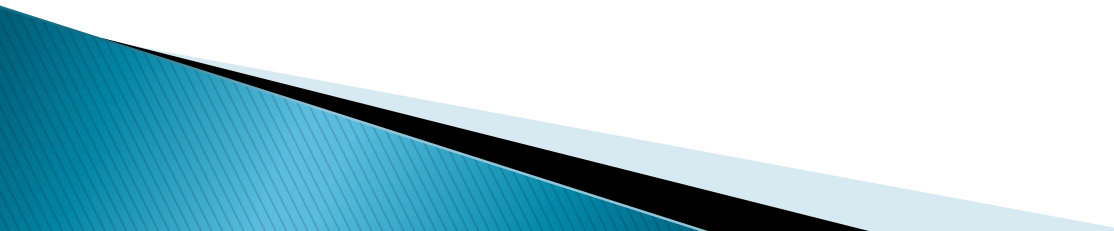
ASET Content (2)

- ▶ AOP
 - ▶ Runtime verification, MOP, SOA
 - ▶ QoS
 - ▶ Serverless
 - ▶ Functional and Non-Functional Testing
 - ▶ Selenium
 - ▶ Refactoring
 - ▶ Code Reuse
 - ▶ Ethics
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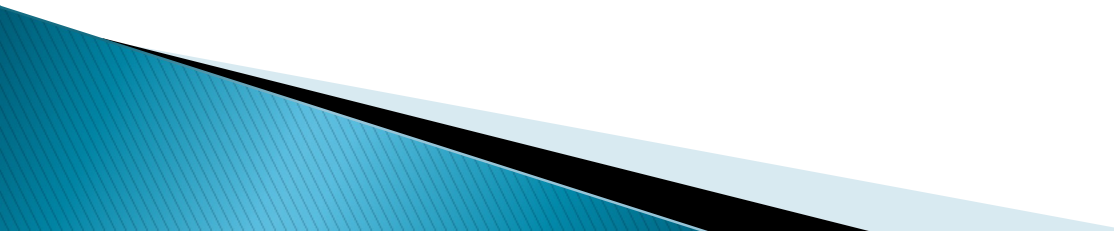
SE Labs (What you should know ...)

- ▶ Requirement analysis
 - ▶ UML Diagrams
 - ▶ Design Patterns
 - ▶ Unit testing
 - ▶ Java, C++, C#, OOP (coding style)
 - ▶ Communication, Planning
 - ▶ Assessment, Budget, Negotiation
- 

ASET Labs (1)

- ▶ Modeling (BPMN, EMF, IBM Rational)
 - ▶ AOP, MOP, SOA
 - ▶ QoS
 - ▶ Application of advanced design patterns
 - ▶ Refactoring: Improving the design of existing code
 - ▶ Automated testing, non-functional testing, Selenium, Code Coverage
- 

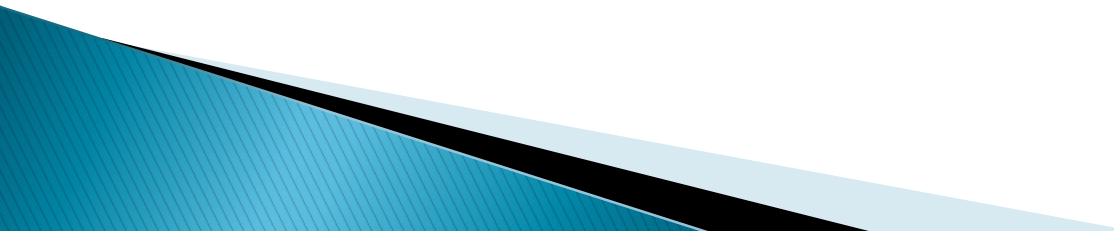
ASET Labs (2)

- ▶ It negotiates scores per team, per member...
 - ▶ There is no upper limit for points
 - ▶ THERE exists lower limit for labs and project scores
 - ▶ **Important:** Make connection with Java Technologies labs!
- 

Project

- ▶ Teamwork (3–4–5–6 persons) + 1, 2 scientific coordinators
- ▶ Will involve:
 - Research project following specific steps in software engineering
 - Documentation (what others have done, what are the most important names in the field, what they did, tools, reference sites, + / -)
 - Modeling using UML and BPMN Diagrams
 - Implementation (main module, interface, AOP)
 - Automated testing
 - Evaluation, Comparison with other systems, statistics
Documentation, Articles

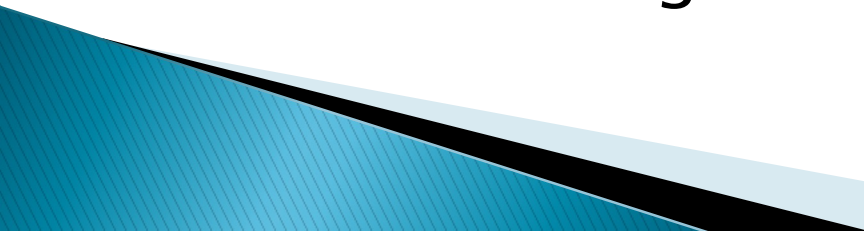
Exam

- ▶ Without documentation 35 minutes
 - ▶ Multiple choice questions
 - ▶ Emphasis will be on understanding the theoretical concepts presented in class and used in lab practice
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Companies Presentations

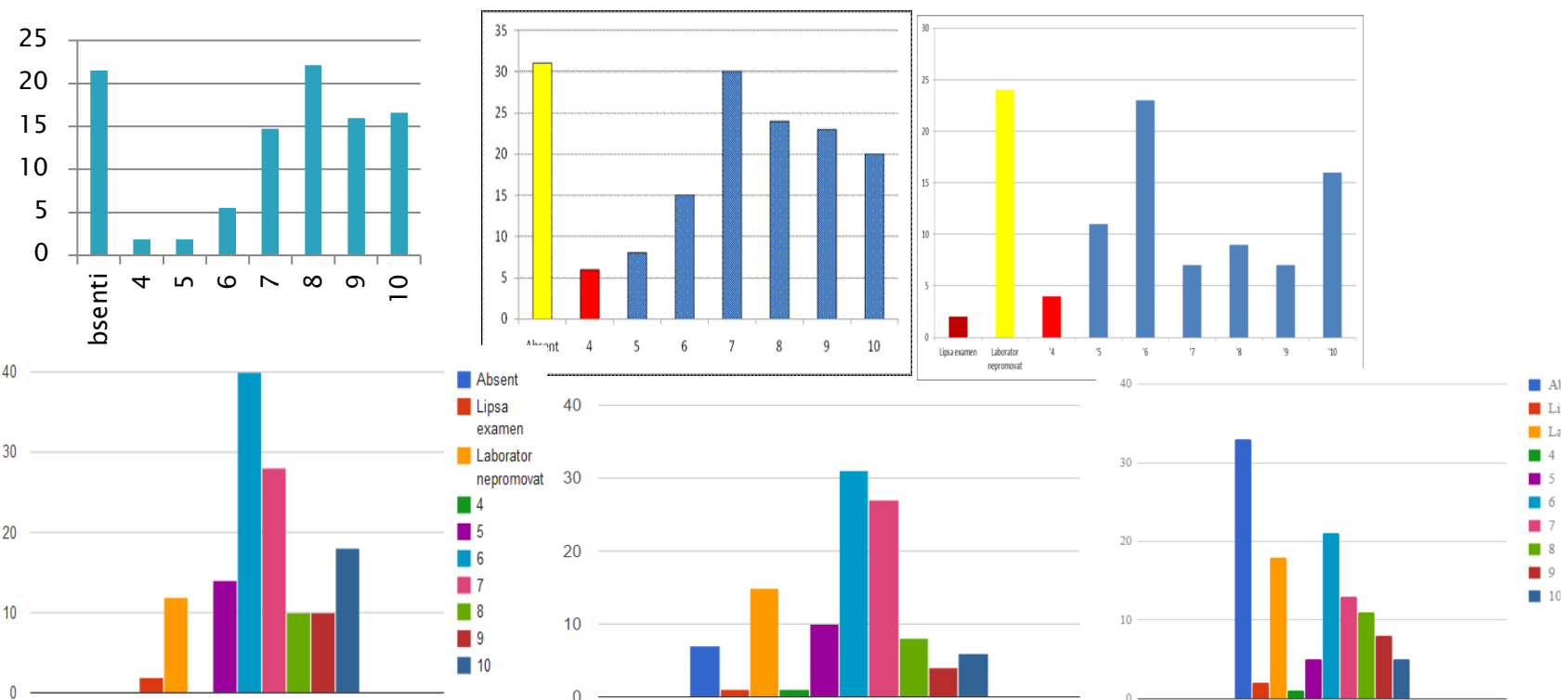
- ▶ During the semester, IT companies from Iasi will be invited to do technical presentations to the students
- ▶ At exam or at lab, some questions/requests will be related to these presentations

Scoring (1)

- ▶ **Lab grade** – obtained during the first 6 labs (theme weeks, teamwork) ~ complete implementation
 - ▶ **Project grade** – produced in the last 6 labs (a team project where each will contribute) ~ completed research component
 - ▶ **Exam grade** – 35 minute, the focus will be on understanding the concepts covered
- 

Scoring (2)

- ▶ **Final grade** = $10 * (\text{lab_points} + \text{exam_points}) / (\text{max_lab_points_without_bonuses} + \text{max_exam_points})$
- ▶ **Conditions of promoting:**
 - $\text{Lab_points} > 60 \% * \text{Lab_Max_points}$
 - **Exam_points** $> -\infty$



Communication protocol

- ▶ On request you will send partial solutions to e-mail
- ▶ 3 requests (**-5 points for each requirement not respected**):
 - Subject: [ASET] – Solution stage X
 - Attachment: TGZ archive
 - Content: Signature Ionescu George, First Year Master, SD Specialization

Bibliography

- ▶ Web page with SE courses Adrian Iftene
<https://edu.info.uaic.ro/ingineria-programarii/>
- ▶ Web page Ovidiu Gheorghies (worked with Adriana G.)
<http://profs.info.uaic.ro/~ogh/ip/>
- ▶ Ian Sommerville: Software Engineering, Addison Wesley, 2001
- ▶ Craig Larman: Applying UML and Patterns, Addison Wesley, 2002
- ▶ Erich Gamma, Richard Helm, Ralph Johnson, John Vissides: Design Patterns, Elements of Reusable Object-Oriented Software, Addison Wesley, 1998
- ▶ Internet

Microsoft Teams

- ▶ The Course will be in hybrid mode
- ▶ Microsoft Teams