

# Software Systems Verification and Validation

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Cluj-Napoca

2023-2024







# Software Systems Verification and Validation

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"Tell me and I forget, teach me and I may remember, involve me and I learn."

(Benjamin Franklin)

# Outline

- **Class Management**
- Teachers
- Class schedule
- Grading
  - Overall activity
  - Seminar activity
  - Laboratory activity



# Class Management

- Microsoft Teams
- Join
  - Microsoft Team: 2023\_2024\_InfoEng\_SSVV
  - Code: **e1676pd**
- **2023-2024 – SSVV – face to face**
  - Lectures
  - Seminars
  - Laboratories

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# Teachers

- Lecture: Assoc. Prof. Vescan Andreea
- Laboratory:
  - PhD Student Iudean Bogdan
    - bogdan.iudean[at]ubbcluj.ro
  - Associate Teacher Galbîn-Năsui Andreea
    - nasui.galbin[at]ubbcluj.ro
  - Associate Teacher Nădejde Camelia
    - camelia.nadejde[at]ubbcluj.ro
  - Assoc. Prof. Vescan Andreea
    - andreea.vescan[at]ubbcluj.ro
- Seminar:
  - Assoc. Prof. Vescan Andreea

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# Class schedule

| Software Systems Verification and Validation (tentative schedule) |                |  |            |                         |
|---|----------------|--|------------|-------------------------|
| Week  | Date           | Lecture                                    | Seminar    | Laboratory              |
| 1   | 26 feb – 1 mar | Inspection                                 | Inspection | Inspection              |
| 2   | 4 -8 mar       | Testing. BBT                               |            |                         |
| 3   | 11-15 mar      | WBT  | BBT        | BBT                     |
| 4   | 18-22 mar      | Levels of testing, Pipeline, Bogdan Iudean |            |                         |
| 5   | 25-29 mar      | Invited Lecture EVOZON (pending)           | WBT        | WBT                     |
| 6   | 1-5 apr        | Agile                                      |            |                         |
| 7   | 8-12 apr       | Invited Lecture Altom (pending)            | Levels     | Levels                  |
| 8   | 15 -19 apr     | Symbolic exe.; Model checking              |            |                         |
| 9   | 22-26 apr      | Correctness                                | Web        | Web                     |
| 10  | 20 apr.-3 may  | Invited Lecture Connatix                   |            |                         |
| Holidays  | 6-10 may       |  |            |                         |
| 11  | 13-17 may      | Soft skills                                | All        | Bachelor Thesis testing |
| 12  | 20-24 may      | Exam preparation                           |            |                         |



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# Grading

- $F = 20\% L + 20\% S + 50\% E$  (+ 1p feedback)
  - L=Laboratory; S=Seminar; E=Written;
  - Bonus points! See the homepage of the course!
- Conditions to participate at the final exam
  - There is no restriction regarding the participation at the written examination regarding obtained marks at L, S.
  - Attendance lab (5 out of 6) -90%
  - Attendance sem (4 out of 6) – 75%
  - Council of the Faculty of Mathematics and Computer Science
    - 28 September 2016
    - <http://www.cs.ubbcluj.ro/hotararea-1893-28-09-2016-a-consiliului-facultatii-privind-modificarea-regulamentului-de-functionare-al-fmi/>
    - Motivation of absences
    - 11 October 2016
      - Decision regarding the motivation of the absences of the students
    - <http://www.cs.ubbcluj.ro/hotarare-privind-motivarea-absentelor-studentilor-nivel-licenta/>
    - Students will present the documents to motivate absences from the seminar/laboratory within one week from the date of absence.
    - If the motivation comes after more than a week, then apply to the dean's office.
- L/S work may not be redone in the retake session.
- Students from Previous Years to 2023-2024 - All the above rules apply to students from previous years (except attendances).
- Conditions to pass/complete the SSVV discipline:
  - $F \geq 5$  final grade.

[https://www.cs.ubbcluj.ro/files/curricula/2023/syllabus/IE\\_sem6\\_MLE5014\\_en\\_avescan\\_2023\\_7737.pdf](https://www.cs.ubbcluj.ro/files/curricula/2023/syllabus/IE_sem6_MLE5014_en_avescan_2023_7737.pdf)

$F = 25\% L + 25\% S + 50\% E$  (+ 1p bonus)

# Grading - Gamifying Education

<https://ieeexplore.ieee.org/document/8166715>

<https://ieeexplore.ieee.org/document/8658524>

|                | Given points   | Side Quests (Lab Assignments)                          | Social Quests (Sem Assignments)   | Epic Quests (Final Exam) | XP intervals | Grade |
|----------------|--|--|---|--------------------------|--------------|-------|
| Normal session | 300 XP Feedback  | 600 XP (in-class 25 XP + take-home 75 XP for each lab) | 600 XP (300XP SLR+Video presentation + 100 XP for each Portofolio activity) | Up to 1500 XP            | [1400,1500]  | 5     |
|                |  |  |   |                          | [1501,1800]  | 6     |
|                |  |  |   |                          | [1801,2100]  | 7     |
|                |  |  |   |                          | [2101,2400]  | 8     |
| Retake session | Points obtained in the didactic activity period (labs and seminar and bonus activity cannot be redone in the normal/retake session). |  |   | Up to 1500 XP            | [2401,2700]  | 9     |
|                |  |  |   |                          | Over 2700    | 10    |
|                |  |  |   |                          |              |       |

**Final exam – you must come (be present) to final exam in order to compute the grade!**

**Bonus points = 300 XP (1p)**

**Participating in Education related Research study**

**Information to be provided after the first lecture**

**Bonus points = 600 XP**

**Research paper (See available topics in Teams – after the first lecture)**

**Maximum 3 teams.**

**Topic by teacher + 2 members/team + deliverables**

**Paper submitted to journal for review (before 24 May 2024)**

**Remark: If you are interested in this activity, the deadline for enrollment (send email) is 8 March 2024 (week 2).**

# Grading - Seminar

- Attendance: 4 out of 6 required
  - 20% of the final grade
  - You can change the date of your scheduled seminar if you exchange your “place” with another student.

## Seminar structure

Assignment 1 – 10 minutes – discussion on a given topic (the teacher is an observer)

Assignment 2 – 60-70 minutes – assignments on a given topic

Assignment 3 – 10 minutes – quiz about required reading and seminar discussions.

| Sem 1      | Sem 2 | Sem 3                                      | Sem 4   | Sem 5  | Sem 6   |
|------------|-------|--|---|--|---|
| Inspection | BBT   | WBT  | Levels<br>Exploratory T.                            | Web<br>RIMGEN                                  | All   |
|            |       | 100XP<br>Portofolio<br>About<br>Inspection | 100XP<br>Portofolio<br>About<br>Test Case<br>Design | 100XP<br>Portofolio<br>About<br>Exploratory T. | 300 XP – SLR<br>Report<br>+video+peer<br>review |



# Grading – Seminar (2)

## Portofolio activities

- **1. Portofolio about Inspection**
  - Details provided in Lecture 1
  - To be submitted in Seminar 3
  - Team: 3 persons/team
- **2. Portofolio about Test Case Design**
  - Details provided in Lecture 3
  - To be submitted in Seminar 4
  - Team: 3 persons/team
- **3. Portofolio about Exploratory Testing**
  - Details provided in Lecture 7
  - To be submitted in Seminar 5
  - Team: 3 persons/team

# Grading – Seminar (3)

Conduct a Systematic Literature Review on a provided research topic.

- SLR (Systematic Literature Review) – Report pdf – 150 XP
- Video presentation + Peer review – 150 XP
- References
  - Barbara Kitchenham, Procedures for Performing Systematic Reviews, 2004
  - Barbara Kitchenham, Guidelines for performing Systematic Literature Reviews in Software Engineering, 2007
- **Team: 3 persons/team**
- **Tasks (48h:12=4h/week for the team)**
- **Task a) Report pdf**
  - 01. Search and save the title (doi) of the articles (minimum 30 articles) (6h)
  - 02. Read abstracts and reduce from 30 to 10 articles (6h). **The papers will be provided by the teacher after you send your list of 10 articles.**
  - 03. Read each of the 10 papers and produce 1 paragraph/paper (approach, used method, dataset, obtained results) (3h\*10articles=30h)
  - 04. Summarizing table with the 10 articles (6h)
  - 05. Report containing
    - Explain the methodology applied (all the steps and findings regarding various characteristics of the selected articles).
    - The 10 paragraphs, one for each paper.
    - Summarizing table.
- **Task b) Pecha Kucha type Presentation**
  - Time for the Recorded presentation - 5 minutes
  - Presentations will be played during the last seminar.
  - Peer review minimum 3 presentations during the last seminar.

# Grading - Laboratory

- Attendance: 5 out of 6 required
  - 20% of the final grade
    - You can change the date of your scheduled laboratory if you exchange your “place” with another student.

## Laboratory structure

Assignment 1 – 10 minutes – current lab discussion, problem assignment

Assignment 2 – 40 minutes – in-class problem solving and delivery

Assignment 3 – 40 minutes – delivery of the previous lab (exception first lab)

| Lab 1             | Lab 2             | Lab 3                        | Lab 4                        | Lab 5                        | Lab 6   |
|-------------------|-------------------|------------------------------|------------------------------|------------------------------|---|
| Inspection        | BBT               | WBT                          | Levels                       | Web                          | All (Bachelor Thesis)   |
| Assignment 1 (L1) | Assignment 2 (L2) | Assignment 3 (L3)            | Assignment 4 (L4)            | Assignment 5 (L5)            | Assignment 6 (L6)   |
|                   | L1_Delivery1      | L1_Delivery2<br>L2_Delivery1 | L2_Delivery2<br>L3_Delivery1 | L3_Delivery2<br>L4_Delivery1 | L4_Delivery2<br>L5_Delivery1<br>L6_Delivery1<br>(in-class only) |

# Grading – Laboratory (2)

- Each Lab Assignment
  - In-class assignment
    - 25 XP
  - Take-home assignment
    - 75 XP
- Work in teams – Recommended: 2 members per team (maximum 3 allowed (one team in a semigroup) if one students does not have a partner in his/her own semigroup).
- No more than two lab problems will be delivered in one lab meeting. An extra lab problem is delivered **only if time allowed**.
- Delay in lab submissions (take-home only) – One third points from that lab grade.
- Maximum 2 weeks delay in submission of the homework assignment.
- Each time you deliver a laboratory - the Deliverables of the in-class and take-home assignments must be uploaded in Teams.
- 3 or 4 maximum retake students per semigroup