

SYLLABUS

1. Data about the program of study

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| 1.1 Institution | The Technical University of Cluj-Napoca |
| 1.2 Faculty | Faculty of Automation and Computer Science |
| 1.3 Department | Automation |
| 1.4 Field of study | Systems Engineering |
| 1.5 Cycle of study | Bachelor of Science |
| 1.6 Program of study/Qualification | Automation and Applied Informatics, English |
| 1.7 Form of education | Full time |
| 1.8 Subject code | 26.00 |

2. Data about the subject

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|------------------------------------|--|--|---|--|--|----|
| 2.1 Subject name | | Software Engineering | | | | |
| 2.2 Course responsible/lecturer | | S.I.dr.ing.Radu-Florin Miron: Radu.Miron@aut.utcluj.ro; | | | | |
| 2.3 Teachers in charge of seminars | | S.I.dr.ing. Radu-Florin Miron: Radu.Miron@aut.utcluj.ro ; S.I.dr.ing. Octavian Cuibus: Octavian.Cuibus@aut.utcluj.ro Asist.dr.ing. Dahlia Al-Janabi: Dahlia.Aljanabi@aut.utcluj.ro | | | | |
| 2.4 Year of study | 2 | 2.5 Semester | 2 | 2.6 Assessment (E – exam, C – colloquy, V – verification) | | E |
| 2.7 Subject category | DF – fundamental, DD – in the field, DS – specialization, DC – complementary | | | | | DD |
| | DI – imposed, DO – optional, DFac – facultative | | | | | DI |

3. Estimated total time

| | | | | | | | | | | |
|---|-----|-----------|--------|----|----------|--|--------------|----|---------|----|
| 3.1 Number of hours per week | 4 | of which: | Course | 2 | Seminars | | Applications | 2 | Project | |
| 3.2 Number of hours per semester | 125 | of which: | Course | 28 | Seminars | | Applications | 28 | Project | |
| 3.3 Distribution of the time fund (hours per semester) for: | | | | | | | | | | |
| a) Individual study | | | | | | | | | | 16 |
| b) Manual, lecture material and notes, bibliography | | | | | | | | | | 10 |
| c) Supplementary study in the library, online and in the field | | | | | | | | | | 30 |
| d) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 10 |
| e) Tutoring | | | | | | | | | | 3 |
| f) Exams and tests | | | | | | | | | | |
| 3.4 Total hours of individual study | | | | | 69 | | | | | |
| 3.5 Total hours per semester | | | | | 125 | | | | | |
| 3.6 Number of credit points | | | | | 5 | | | | | |

4. Pre-requisites (where appropriate)

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| 4.1 Curriculum | Logic design, Computer architectures Computer programming |
| 4.2 Competence | Basic knowledge from mathematics, physics, mechanical engineering, electric and electronics engineering used in system engineering. |

5. Requirements (where appropriate)

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| 5.1. For the course | N/A |
| 5.2. For the applications | the attendance is compulsory |

6. Specific competences

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| 6.1 Competențe profesionale | C2 Operating with fundamental concepts in computer science, information technology, and communications. C2.2 The reasoned use of concepts from computer science and computer technology in solving well-defined problems in systems engineering and in applications that require the use of hardware and software in industrial |
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| | systems or in computer systems. |
| 6.2 Competențe transversale | N/A |

7. Obiectivele disciplinei

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|-------------------------|---|
| 7.1 General objectives | <ul style="list-style-type: none"> object-oriented programming, designing control applications using the Unified Modeling Language (UML), implementing software projects |
| 7.2 Specific objectives | <ul style="list-style-type: none"> the reasoned use of concepts from computer science and computer technology in solving well-defined problems in systems engineering and in applications that require the use of hardware and software in industrial systems or in computer systems designing control applications using methods from software engineering |

8. Conținuturi

| 8.1 Lecture (syllabus) | Nr.ore | Teaching methods | Notes |
|--|--------|-------------------------|-------|
| 1. Introduction to software engineering | 2 | Multimedia, interactive | |
| 2. Introduction to Java language | 2 | | |
| 3. Programming Basic Elements | 2 | | |
| 4. Object Oriented Programming | 2 | | |
| 5. Object management | 2 | | |
| 6. Input/output Programming for control applications | 2 | | |
| 7. Graphical interface programming for control applications | 2 | | |
| 8. Multithreading programming of control applications | 2 | | |
| 9. Design of control applications using Unified Modeling Language (UML) | 2 | | |
| 10. Specification of control applications using UML | 2 | | |
| 11. UML design diagrams for control applications | 2 | | |
| 12. Implementation of UML design diagrams | 2 | | |
| 13. Examples of control application design | 2 | | |
| 14. Examples of control application implementation | 2 | | |
| Bibliography | | | |
| 1. T. Leția. <i>Programarea avansată în Java</i> . Editura Albastră (Microinformatica), 2002. | | | |
| 2. K. Sierra, B. Bates, <i>Head First Java, 3rd Edition</i> , O'Reilly Media, Inc, USA, 2022 | | | |
| 3. OMG – Unified Modeling Language Specification. | | | |
| 4. R.G. Urma, M. Fusco, A. Mycroft, <i>Modern Java in Action</i> , Manning Publications, 2018. | | | |
| 5. B. Eckel. <i>Thinking in Java. Second edition</i> . Pearson Education, 2006. | | | |
| 6. https://docs.oracle.com/javase/tutorial/ | | | |
| 8.2 Aplicații (seminar/laborator/proiect)* | Nr.ore | Teaching methods | Notes |
| 1. Introduction to Java environment tools and IDE | 2 | Multimedia, interactive | |
| 2. Applications with classes and objects | 2 | | |
| 3. Object management applications | 2 | | |
| 4. Exception handling and string applications | 2 | | |
| 5. Thread construction. | 2 | | |
| 6. Concurrent programming applications | 2 | | |
| 7. Graphic interfaces | 2 | | |
| 8. Class and object diagram implementation | 2 | | |
| 9. UML. Control application specification | 2 | | |
| 10. Sequence diagram implementation | 2 | | |
| 11. State diagram construction and implementation | 2 | | |
| 12. Activity diagram construction and implementation | 2 | | |
| 13. Compensatory | 2 | | |
| 14. Final test | 2 | | |
| Bibliography | | | |

1. <http://radumiron.net>
2. <https://github.com/isp-cluj>

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The courses subjects cover the requirements of the IT employers, mainly those in the field of software engineering.

The laboratories are inspired from real life applications developed by IT companies from Cluj.

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|--|---------------------|---|---------------------------|
| Course | exam (E) | Written test | 0.5 |
| Seminars | | | |
| Laboratories | tests (C) | Knowledge assessment, problem solving, written tests. | 0.5 |
| Project | | | |
| Minimum standard of performance: E≥5; C≥5 | | | |

| Date of filling in: | Titulari | Title Firstname NAME | Signature |
|---------------------|--------------|---|-----------|
| 14.06.2024 | Course | S.L. Dr. Ing. Radu Miron | |
| | Applications | S.L. Dr. Ing. Radu Miron S.L. Dr. Ing. Octavian Cuibus Asist. Dr. Ing. Dahlia Al-Janabi | |

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| Date of approval by the Department Board | Head of Department |
| _____ | Prof.dr.ing. Honriu Valean |
| Date of approval by the Faculty Council | Dean |
| _____ | Prof.dr.ing. Mihaela Dinsoreanu |