



SYLLABUS

1. Study Program

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|-----|------------------------------|--|
| 1.1 | Higher Education Institute | Technical University of Cluj-Napoca |
| 1.2 | Faculty | Electronics, Telecommunications and Information Technology |
| 1.3 | Department | Communications |
| 1.4 | Study domain | Electronics and Telecommunications Engineering |
| 1.5 | Study level | License |
| 1.6 | Study program/ Qualification | Telecommunications Technologies and Systems, Applied Electronics |
| 1.7 | Type of education | IF (Full-time learning) |
| 1.8 | Discipline code | TST-E29.00, EA-E29.00 |

2. Discipline

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|-----|--------------------|--|
| 2.1 | Discipline name | Software Engineering |
| 2.2 | Subject area | Electronics and Telecommunications Engineering |
| 2.3 | Responsible | Professor: Mircea-Florin Vaida, PhD Mircea.Vaida@com.utcluj.ro |
| 2.4 | Titular | Professor: Mircea-Florin Vaida, PhD. Collaborator : Cosmin Strilechi, PhD. |
| 2.5 | Year of study | II |
| 2.6 | Semester | 2 |
| 2.7 | Evaluation | Verif. |
| 2.8 | Type of discipline | DS/DI |

3. Total estimated time

| Year/ Sem | Discipline name | No. of weeks | Course | | | | Applications | | | | Indiv. study | TOTAL | ECTS |
|--------------|----------------------|--------------|--------------|---|---|---|--------------|---|----|---|--------------|-------|------|
| | | | [hours/week] | | | | [hours/week] | | | | | | |
| | | | C | S | L | P | S | L | P | | | | |
| III/1 | Software Engineering | 14 | 2 | 0 | 2 | 0 | 28 | 0 | 28 | 0 | 44 | 100 | 4 |

| | | | | | | | | |
|---|---------------------------------|-----|-----|--------|----|-----|--------------|-------|
| 3.1 | Number of hours per week | 4 | 3.2 | course | 2 | 3.3 | applications | 2 |
| 3.4 | Total hours per curriculum | 56 | 3.5 | course | 28 | 3.6 | applications | 28 |
| Individual study | | | | | | | | Hours |
| Study based on manuals, course materials, references and notes | | | | | | | | 26 |
| Supplementary documentation in libraries, electronic platforms and on field | | | | | | | | 8 |
| Preparation of seminars/laboratories, homework's, essays, portfolios | | | | | | | | 4 |
| Tutorial work | | | | | | | | 2 |
| Assessments | | | | | | | | 3 |
| Other activities | | | | | | | | 1 |
| 3.7 | Total hours of individual study | 44 | | | | | | |
| 3.8 | Total hours per semester | 100 | | | | | | |
| 3.9 | ECTS | 4 | | | | | | |

4. Prerequisites (if necessary)

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| 4.1 | Curriculum | Basic knowledge from: - Computer programming – Languages course - Computer programming – Algorithms course |
| 4.2 | Competences | Basic knowledge of OOP |

5. Requisites (if necessary)

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|-----|--------------|---|
| 5.1 | Course | Video-projector, screen, whiteboard, blackboard |
| 5.2 | Applications | PCs with Internet access |

6. Specific competences acquired

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|--------------------------|---|--|
| Professional competences | Theoretical knowledge (What do the student should know) | <ul style="list-style-type: none"> - -To program basic Java applications. - -To develop Java graphical and I/O applications. - -Java multithreading. - -Distributed Java programming using sockets (stream, UDP). |
| | Acquired skills (What the student is able to do) | <p>To develop:</p> <ul style="list-style-type: none"> - Java applications that: <ul style="list-style-type: none"> - Implement basic algorithms. - Are developed by comparison with C/C++ applications. - Write Java applications that: <ul style="list-style-type: none"> - Implement and use GUI; - Use multithreading processes. - Use I/O from and to files. - Allow distributed facilities. |
| | Acquired abilities (what equipment/ instruments/ software the student is able to handle) | <p>After studying this discipline, the students will be able to:</p> <ul style="list-style-type: none"> - Use the main facilities offered by a Java IDE. - Develop and debug various Java applications. |
| Transversal competences | <p>CT3 Adapting to new technologies, professional and personal development through continuing education using electronic documentation and printed sources, in Romanian and in at least one international language (English). Competencies for analysis and synthesis and optimization systems thinking. Flexibility in thinking and ability to work with interdisciplinary concepts and tools.</p> | |

7. Discipline objectives (based on the grid of specific competences acquired)

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|-----|---------------------|---|
| 7.1 | General objective | Development of competences in basic Java programming language |
| 7.2 | Specific objectives | <ol style="list-style-type: none"> 1. Theoretical knowledge's about basic programming in Java language. 2. Practical abilities to use Eclipse IDE for Java OO applications. |

8. Contents

| 8.1. Course (titles) | | Teaching methods | Observations |
|----------------------|---|----------------------------|----------------|
| 1 | Basic concepts regarding the Object Oriented Programming and Java. Introduction in Java. IDE in Java. | Presentations, discussions | Videoprojector |
| 2 | Java from C++ programmers. Java data types, arrays, String classes. | | |
| 3 | Java classes, inheritance, interfaces, packages. | | |
| 4 | Java exceptions. Collections. | | |
| 5 | Java applets. | | |

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|--|---|-------------------------------|--------------|
| 6 | GUI programming in Java. | | |
| 7 | Java events, the evolution of the events handling mechanisms. The description of the main elements included in the AWT and Swing packets. | | |
| 8 | Other elements concerning the AWT and Swing graphics. | | |
| 9 | Input and Output in Java File handling in Java. Serialization, de-serialization. | | |
| 10 | The Socket (stream) programming in Java Network programming in Java using the client-server model. | | |
| 11 | The socket programming. (Datagram programming). | | |
| 12 | Basic concepts about the Java multithreading. Multithreading in Java. Mutual exclusion, synchronization in Java. | | |
| 13 | Basic elements regarding RMI in Java. | | |
| 14 | Theoretical evaluation. | | |
| 8.2. Applications (laboratory work) | | Teaching methods | Observations |
| 1 | C++ recapitulative applications. | Experiments, tests using PC's | Network PC's |
| 2 | The Eclipse (NetBeans) environment. Stand-alone Java applications. | | |
| 3 | Data types, Strings and arrays in Java. | | |
| 4 | Classes, Inheritance in Java. Java interfaces. | | |
| 5 | User defined packages. | | |
| 6 | Exceptions in Java. | | |
| 7 | Applets in Java. | | |
| 8 | Graphical Java applications. | | |
| 9 | Events and AWT graphics in Java. Swing graphics in Java. | | |
| 10 | I/O and file applications in Java. | | |
| 11 | Files, serialization, deserialization in Java. | | |
| 12 | Java distributed applications using stream sockets and datagram sockets. | | |
| 13 | Multithreading in Java. –Homework's evaluations. | | |
| 14 | Final practical test and evaluation. | | |
| <p>References:</p> <p>In TUC-N library</p> <ol style="list-style-type: none"> 1. Cosmin Strilețchi, Mircea-F. Vaida, Elemente de baza privind programarea si securitatea in mediul Java, UTPress, 2009 2. Mircea-Florin Vaida, si colab., Java 2 Enterprise Edition (J2EE). Aplicatii multimedia, Editura Albastra Cluj-Napoca, 2002 3. Mircea-Florin Vaida, Petre G. Pop, Cosmin Strilețchi, Ligia Chiorean, Calin G. Login, Tehnologii avansate privind dezvoltarea aplicatiilor software in limbajul C/C++, C# si Java, Casa Cartii de Stiinta, 2006 <p>Additional materials</p> <p>- course notes at http://helios.utcluj.ro/lab/index.php</p> <p>- laboratory materials available on the website http://helios.utcluj.ro/lab/index.php</p> <p>In other libraries</p> <ol style="list-style-type: none"> 1. Cosmin Strilețchi, Petre Gavril Pop, Mircea-Florin Vaida, Ligia-Domnica Chiorean, Elemente practice de bază pentru programarea în limbajele C# și Java, Casa Cartii de Stiinta, 2012 2. Stefan Tanasa, si colab., Java de la 0 la expert, Editura Polirom, 2003, 2007 3. Vaida M.F., Pop G.P., Strilețchi C., Chiorean Ligia, - Aplicații în limbajele C/C++ și Java, Casa Cartii de Stiinta, Cluj-Napoca, 2004 | | | |

9. Discipline content corroborated with the expectations of the epistemic community representatives, associations, professional and related program employers

Acquired skills will be needed in the following possible COR occupations: electronics engineer, telecommunications engineer, system and computer design engineer, or new occupations proposed to be included in COR (sales support engineer, developer of multimedia applications, network operating engineer, test engineer, project manager, traffic engineer, communications system consultant.

10. Assessment

| Type of activity | 10.1 | Evaluation criteria | 10.2 | Evaluation method | 10.3 | The weight of the final grade |
|---|------|---|------|---|------|-------------------------------|
| Course | | Theoretical written and oral test with questions/code | | Written/oral test (T=33%) | | T = 33% |
| Application | | Solving a problem P on a computer (1 hour). The laboratory L will also be evaluated | | Lab. evaluations and computer test (P=34%, L=33%) | | P+L = 67% |
| 10.4 Minimum performance standard | | | | | | |
| The final grade (N) is calculated as average of marks obtained in the evaluation of ongoing activities and application type: $N = (T + L + P) / 3.0$. The condition for obtaining the ECTS credits is that N and all components of the final grade to be higher than or equal to 5 (five). | | | | | | |

Date
1.10.2018

Titular
Professor
Mircea-Florin Vaida, Ph.D.

Responsible
Professor
Mircea-Florin Vaida, Ph.D.