| **Óbuda University**<br>John von Neumann Faculty of Informatics | Institute of Software Engineering |
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**Name and code:** Software design and Development II. (NIXSF2EBNE) **Credits:** 6

*Computer Science BSc szak* *Daytime tagozat 2023/24 tanév II. félév*

| Subject lecturers: Dr. László Csink | | | | |
|---|---|---|---|---|
| Prerequisites:<br>(kóddal) | Software design and development I (NIXSF1EBNE) | | | |
| Hours by week: | Lecture: 3 | Seminar: 0 | Lab. hours: 3 | Consultation: 0 |
| Way of assessment: | Examination | | | |

**Course description**

*Goal*: Based on SWDD I, the goal is to deepen theoretical and practical knowledge in software design and development.

*Course description*: Programming paradigms. Inheritance. Method hiding. Polymorphism. Abstract classes and interfaces. Iterators. Components. Operator overloading. Exceptions. Generic classes. Advanced sorting. Dynamic arrays. Lists. Queue and stack. Binary search tree. Red and black tree. B-tree. Heaps. Directed and undirected graphs. Trees. Spanning trees. Kruskal and Prim algorithm. Connected components. Search for a path in the graph. Hashing. Maximal flow.

**Lecture schedule**

| Education week | Topic |
|---|---|
| 1 | Programming paradigms. |
| 2 | Advanced object oriented programming 1. |
| 3 | Advanced object oriented programming 2. |
| 4 | Lists. |
| 5 | Graphs. |
| 6 | Trees. BST. |
| 7 | B-tree, red and black tree. |
| 8 | Heaps. |
| 9 | Spanning trees. Kruskal and Prim algorithm. |
| 10 | Advanced sorting |
| 11 | Hashing. |
| 12 | Maximal flow. |

**Midterm requirements**

Attendance of labs is compulsory. In case you miss more than 3 lectures or more than 3 labs, your semester will be invalid (you will not get a signature) and you will not get the right to sit for the exam. Attendance of lectures and labs will be checked. You must write two midterm tests from the LAB material (exact dates will be specified by the lab teacher). Both results must be over 50 %. If you have not written a test, its result is 0 %. If one of the two tests is under 50 %, a retake test must be written on the last week. If you have missed both tests, or you have missed one test and the other's result is less than 50 %, or you have written both tests but both results are weaker than 50 %, the signature can be obtained only at the so-called signature test that will take place in the examination period.

**Midterm Test Scheduling**

| Education week | Topic |
|---|---|
| 5 | mid-semester (exact date to be determined at the first week) - first lab test (computer program) |
| 12 | last but one week - second lab test (computer program) |
| 13 | last week - retake of the first or the second test, if necessary |

**Midterm grade calculation methods**

See Midterm Requirements.

**Method of replacement**

Repeated exam if necessary.

**Type of exam**

Written exam, only for those who have the signature (both midterm tests better than 50 %, possibly by retake, and attendance).

**Exam grade calculation methods**

| Achieved result | Grade |
|---|---|
| 89-100% | excellent (5) |
| 76-88% | good (4) |
| 63-75% | average (3) |
| 51-62% | satisfactory (2) |
| 0-50% | failed (1) |

| References |
| --- |
| **Obligatory:** |
| Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein: Introduction to Algorithms, The MIT Press (downloadable) |
| **Recommended:** |
| |
| **Others:** |
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