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| **Institute of Applied Mathematics**  | Semester 1. of the curriculum 2023-24-1  |
| Name of the subject:  | Code of the subject:  | Credits:  | Weekly hours:  |
|   | lec  | sem  | lab  |
| **Mathematical Foundations of Informatics**  | NMXIMAEBNF  | 6  | full-time  | 2  | 3  | 0  |
| Responsible person for the subject: Dr. Magdolna SZŐKE  | Classification: senior lecturer  |
| Subject lecturer(s):   |
| Prerequisites:  |   |   |
| Way of the assessment:  | exam  |   |   |
| **Course description**  |
| Goal:  | The aim of the subject is to acquire the mathematical knowledge necessary for IT.  |
| Course description:  | Number systems, number representations. Basic knowledge of number theory. Recursion and mathematical induction. Matrices, determinants, systems of linear equations. Basic knowledge of propositional logic and predicate logic.  |
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| **Lecture schedule**  |
| Education week  | Topic  |
| 1.  | Numeral systems, conversion; number representations  |
| 2.  | Divisibility and its properties; prime factorisation  |
| 3.  | Concept of sequences, notable sequemces. Recursive definition of sequences.  |
| 4.  | Mathematical induction; indirect proof  |
| 5.  | Concept of matrices, matrix operations, concept of determinants  |
| 6.  | Properties of determinants, inverse matrix, adjugate matrix  |
| 7.  | 1st midterm test  |
| 8.  | Systems of linear equations, solution by Cramer’s rule  |
| 9.  | Gaussian elimination  |
| 10.  | Propositonal logic: statements, operations   |
| 11.  | Evaluation of formulae, normal forms  |
| 12.  | Arguments  |
| 13.  | 2nd midterm test  |
| 14.  | Predicate logic, midterm test retake  |
| **Mid-term requirements**  |
| Conditions for obtaining a mid-term grade/signature  | Participation in classes, activity in practice lessons, writing the two midterm tests, and achieving at least 50% of the total score.  |
| **Assessment schedule**  |
| **Education week**  | Topic  |
| 7.  | 1st midterm test  |
| 13.  | 2nd midterm test  |
| 14.  | Retake of one of the tests  |
| **Method used to calculate the *mid-term grade*** (to be filled out only for subjects with mid-term grades)  |
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| **Type of the replacement**  |
| Type of the replacement of written test/mid-term grade/signature  | The missing or the less successful midterm test can be retaken in the 14th week. In case the student has written both mid-term papers, but their result is under 50%, they have an opportunity to write a signature retake exam covering the whole course material in the exam-period.   |
| **Type of the exam** (to be filled out only for subjects with exams)  |
| Written  |
| **Calculation of the exam mark** (to be filled only for subjects with exams)  |
| The exam contains theoretical questions and calculation exercises of the overall course material (altogether 70 points max). If the student does not reach at least 50% of the maximum score, the result is fail (1). Otherwise, 30% of their midterm test result will be added to the exam score, thus a total 100 point can be achieved. In case the student fulfilled the signature requirements at the signature retake exam, their midterm score is 15, regardless of the actual score. The final exam grade can be determined by the chart below.  |
| **​​Final grade calculation methods:​**  |
| 86-100: excellent (5) 74-85: good (4) 62-73: satisfactory (3) 50-61: pass (2) 0-49: fail (1)  |
| **References**  |
| Obligatory:  | Seymour Lipschutz, Marc Lipson: Discrete Mathematics, 2007 http://elearning.uni-obuda.hu/  |
| Recommended:  |   |
| Other references:  |   |