|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. Course title: Linear Algebra seminar | | | | | |
|  | | | | |
| 2. Code: | | 3. Type (lecture, practice etc.): seminar | | | |
|  | | | | |
| 4. Contact hours: 2 hoursper week | | 5. Number of credits (ECTS): 2 | | | |
|  | | | | |
| 6. Preliminary conditions (max. 3):   * Algebra 2 lecture and seminar | | | | | |
|  | | | | |
| 7. Announced:fall semester, spring semester, both | | | | | |
|  | | | | |
| 8. Limit for participants: | | | | | |
|  | | | | |
| 10. Responsible teacher (faculty, institute and department):  Ilona Simon PhD (Faculty of Science, Institute of Mathematics and Informatics, Department of Mathematics) | | | | | |
|  | | | | |
| 11. Teacher(s) and percentage: | | Dr. Ilona SIMON | | 100 % | |
| Dr. Csorba Péter | | 100 % | |
| Dr. Frigyik András | | 100% | |
| Dr. Koniorczyk Mátyás | | 100% | |
|  | |  | |
|  | | | | |
| 12. Language:English | | | | | |
|  | | | | |
| 13. Course objectives and/or learning outcomes:  Objectives: The lecture intends to introduce students to the world of linear algebra and to deepen their knowledge in this range of Mathematics.  Learning outcomes: students completing the course will have *knowledge* on basic linear algebraic concepts and theorems. They will be *able* to apply the properties of these concepts. They will have a *competence* of evaluating readings in linear algebra. Their positive *attitude* towards linear algebraic methods will increase significantly. | | | | | |
|  | | | | |
| 14. Course outline   1. Revision and progress: Vector spaces, basis, dimension, subspaces. Examples. Linear combination, linear independence. 2. R^n, norm, scalar product/dot product, vectorial product, box product in R^n. Orthogonality, orthogonal projection. applications in vector geometry. 3. Revision and progress: Determinants. 4. Matrices, operations, inverse, rank. Algebra. Vandermonde-matrices. Applications. 5. Revision and progress: Factor spaces, direct spaces. 6. Linear maps, transformations, their matrices. Kernel and Image. Operations with linear maps. The matrices of linear maps in different bases. 7. Revision and progress: Linear equation systems, solutions, Gauss elimination method, Cramer-test. Gauss–Jordan-elimination method. Applications. (The method of least squares, Wronski-determinant.) 8. Revision and progress: Eigenvalue, eigenvector, characteristic polynomial. 9. Self-adjoint matrices. Some special classes of matrices. 10. Linear functionals, dual spaces. Bilinear functionals, orthogonalization. Gram–Schmidt orthogonalization method. 11. Quadratic functions. Complex bilinear functionals. Applications. 12. Euclidean spaces. 13. Transformations. | | | | | |
|  | | | | |
| 15. Mid-semester works  Attending lectures is highly recommended. | | | | | |
|  | | | | |
| 16. Course requirements and grading  Written exam is based on lectures, accessible electronic sources and lecture materials.  Grades:  0–50% fail  51–65% acceptable  66–75% average  76–90% good  91–100% excellent | | | | | |
|  | | | | |
| 17. List of readings   1. Anton, Howard. Elementary linear algebra. John Wiley & Sons, 2010. | | | | | |
|  | | | | |
| 18. Recommended texts, further readings   1. Larson, Ron. Elementary linear algebra. Cengage Learning, 2012. 2. Kolman, Bernard, and David Ross Hill. Elementary linear algebra. Pearson College Division, 2000. | | | | | |
|  | | | | |
| **Date** | 14 May, 2017 | **Prepared by** |  | | |
| Dr. Ilona SIMON  responsible teacher | | |
|  | | | | |
| **Endorsed by** | | |  | | |
| Dr. László TÓTH program supervisor | | |