

Course Name	Linear Algebra II		
Semester, Year	Second Semester, 2018	Number of Credits	2 credits
Course level	1000	Course Number	27086
Instructor(s) (Institution)	Michele Torielli (大学院理学研究院)		
Course Objectives	<p>This course covers basic knowledge on vector spaces, linear mappings and eigenvalue problems.</p> <p>We represent linear mappings between vector spaces by matrices associated with bases of these vector spaces.</p> <p>We define eigenvalues and eigenvectors of square matrices, and illustrate how to compute them.</p> <p>In particular, we explain the diagonalization of a symmetric matrix.</p> <p>We show that a diagonalizable linear transformation can be characterized by its eigenvalues and eigenspaces.</p>		
Course Goals	<p>Students should be have the following skills:</p> <ul style="list-style-type: none"> - to understand vector spaces, linearly (in)dependence, bases, dimension; - to understand linear mappings, matrix representation; - to compute eigenvalues, eigenspaces, diagonalization; - to compute an inner product on a vector space; - to understand orthogonal matrices. 		
Course Schedule	<ol style="list-style-type: none"> 1. Vector spaces -- Vectors and vector spaces, definitions and examples, subspaces. 2. Vector spaces -- Linear combinations, linearly (in)dependence, span, bases, the dimension. 3. Vector spaces -- Representation matrices, change of basis. 4. Linear mappings -- Definitions, examples, the kernel, the image, the rank, dimension theorem. 5. Eigenvalue problem -- Eigenvalues, eigenvectors, eigenspaces. 6. Eigenvalue problem -- Diagonalization of a matrix: algebraic and geometric multiplicities. 7. Inner product -- Definition and examples, norm, Schwartz's inequality, triangle inequality. 8. Inner product -- Orthogonal complement of a subspace, Gram-Schmit orthogonalization process, orthogonal matrices, diagonalization of real symmetric matrices. 		
Homework	Study at home at least two hours per week -- Check basic notions you learn in the course, and try to solve exercises assigned by the teacher.		
Grading System	<p>Students are graded accordingly to whether or not</p> <ol style="list-style-type: none"> 1. he/she masters basic knowledge (definitions, theorems etc); 2. he/she can correctly answer questions; 3. he/she develops a unified understanding of the basic knowledge; 4. he/she is able to apply the knowledge achieved during the course to given problems. 		
Textbooks / Reading List	<p>To be announced in the first class.</p> <p>To be announced in the first class.</p>		
Websites	https://sites.google.com/site/toriellimichelemaths/home/teaching		
Website of Laboratory			
Additional Information			