Linear Algebra – MAS 5145

Catalog description: Linear transformations, eigenvalues and eigenvectors, characteristic and minimal polynomials, rational and Jordan canonical forms, determinants, quadratic forms, orthogonal diagonalization of symmetric matrices, unitary and Hermitian transformations.

Prerequisites: MAS 4107, Linear Algebra 2, or permission of the instructor.

Corequisites: None.

Required Text: Linear Algebra by K. M. Hoffman and R. Kunze

Supplementary Text: None.

Course description: This course is a one-semester introduction to the foundations of the linear algebra at the introductory graduate level.

Instructional objectives:

- Master the basic notions and techniques of linear algebra
- Develop proof-writing skills and communication of mathematical ideas
- Apply the major theorems of linear algebra

Method of instruction: Lecture.

Schedule of topics covered:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Approx. Number of weeks</th>
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<tbody>
<tr>
<td>Vector spaces, linear dependence, dimension, linear transformations</td>
<td>2 weeks</td>
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<tr>
<td>The endomorphism algebra of a vector space</td>
<td>2 weeks</td>
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<tr>
<td>Matrices and determinants, eigenspaces</td>
<td>2 weeks</td>
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<tr>
<td>Characteristic and minimal polynomials, canonical forms</td>
<td>2 weeks</td>
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<tr>
<td>Quadratic forms, inner product spaces, orthogonal transformations</td>
<td>2 weeks</td>
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<tr>
<td>Hermitian forms, principle axis theorem</td>
<td>2 weeks</td>
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Assessment procedures: Homework 50%, midterm exams 20%, and a final exam 40%.

Grading criteria: 92-100%=A, 90-91%=A-, 88-89%=B+, 82-87%=B, 80-81%=B-, 78-79%=C+, 70-77%=C, 60-69%=D, 0-59%=F
References