Module Description of Linear Algebra II

Module Name	:	Linear Algebra II
Module Level	:	Bachelor
Code, if applicable	:	23H01120103
Subtitle, if applicable	:	-
Courses, if applicable	:	Linier Algebra II
Semester(s) in which the module is taught	:	3 (Third Semester)
Module coordinator(s)	:	Dra. Nur Erawati, M.Si
Lecturer(s)	:	Prof. Dr. Amir Kamal Amir, M.Sc., Dra. Nur Erawati, M.Si., Prof. Dr. Nurdin, S.Si., M.Si.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory course in Second year for Bachelor degree in Mathematics
Type of teaching/teaching method	:	Lecturing, Small Group Discussion, Collaborative Learning, Self-Directed Learning
Contact hours	:	150 minutes Lectures per week, 180 minutes Structured Assignments per week, and 180 minutes Independent Study per week
Workload	:	Total workload is 135 hours per semester which consists of 40 hours per semester for Lectures, 47.5 hours per semester for Independent Study, and 47.5 hours per semester for Structured Assignments
Credit points	:	3 (4.8 ECTS)
Requirements according to the examination regulations	:	Students are required to attend at least 80% of the total meetings which is recorded via the attendance menu at https://sikola-v2.unhas.ac.id/, complete all mandatory assignments, and obtain permission from the lecturer to participate in the written examination.
Recommended prerequisites	:	Linear Algebra I

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<tr><td>Module objectives/intended learning outcomes</td><td>:</td><td>After the completion of this module, the student will be able to:
CLO-1. use concepts that can be diagonalized and linear transformations in solving linear algebra problems;
CLO-2. apply theorems to prove statements in linear algebra;
CLO-3. communicate linear algebra ideas both orally and in writing in groups.

The following is the mapping of the ILO and the CLO of this course:
<table>
<tr><th></th><th>ILO 2</th><th>ILO 3</th><th>ILO 6</th><th>ILO 9</th></tr>
<tr><td>CLO 1</td><td>X</td><td>X</td><td></td><td></td></tr>
<tr><td>CLO 2</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td>CLO 3</td><td></td><td></td><td></td><td>X</td></tr>
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</td></tr>
<tr><td>Content</td><td>:</td><td>The Linear Algebra II course deepens students' understanding of linear algebra by focusing on advanced concepts and applications. The course begins with inner product spaces and orthogonal complements, which extend the study of vector spaces to include notions of orthogonality and projection. Students will learn the Gram–Schmidt process and its application to constructing orthonormal bases, as well as the least squares method for approximating solutions to overdetermined systems. The course also covers change of basis, orthogonal diagonalization, and the concepts of geometric and algebraic multiplicity of eigenvalues. Further topics include linear transformations, their kernels and ranges, inverse transformations, and the use of matrices to represent linear transformations. The course concludes with advanced concepts such as similarity and isomorphism, which highlight structural properties of vector spaces and transformations.</td></tr>
<tr><td>Study and examination requirements</td><td>:</td><td>Study and examination requirements:
● Students must attend 15 minutes before the class starts.
● Students must switch off all electronic devices.
● Students must inform the lecturer if they will not attend the class due to sickness, etc.
● Students must submit all class assignments before the deadline.
● Students must attend the exam to get final grade.</td></tr>
<tr><td>Exams and assessment formats</td><td>:</td><td>Participants are assessed based on the following components: Assignments (20%), Presentation (20%), Quizzes (40%), Report (20%).

Assignments assess student's ability to apply concepts independently, while Reports measure analytical and writing skills. Presentations evaluate oral communication, organization</td></tr>
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<tr><td></td><td></td><td>of ideas, and confidence in delivering academic material. Quizzes are used to test continuous understanding of weekly content. Altogether, these components account for 100% of the final grade.

Students are marked based on their percentage of points obtained and based on the following grade scale:

<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>85 – 100</td><td>A</td><td>4.00</td></tr>
<tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr>
<tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr>
<tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr>
<tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr>
<tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr>
<tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr>
<tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr>
<tr><td>< 40</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Reading list</td><td>:</td><td>1. Karim M. Abadir, Jan R. Magnus, 2005. Matrix Algebra, Cambridge University Press.
2. Horward Anton, Chris Rorres, 2005. Elementary Linear Algebra, Applications Version, Edition 12, John Wiley & Sons.
3. Seymour Lipschutz, Marc L. Lipson, 2004. Schaum’s Outline of Linear Algebra, Edisi 3, McGraw-Hill.</td></tr>
<tr><td>Last revision date</td><td>:</td><td>July 28th, 2025</td></tr>
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