UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS EDUCATION
PHYSICS STUDY PROGRAM
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Bachelor of Physics **MODULE HANDBOOK**

Module name:	Linier Algebra for Physics
Module level, if applicable:	Bachelor Program
Code:	FSK6305
Sub-heading, if applicable:	-
Classes, if applicable:	B-E
Semester:	6
Module coordinator:	Fika Fauzi, S. Si., M. Sc.
Lecturer(s):	Fika Fauzi, S. Si., M. Sc.
Language:	Bahasa Indonesia
Classification within the curriculum:	Elective Course
Teaching format / class hours per week during the semester:	100 minutes lectures and 120 minutes structured activities per week.
Workload:	Total workload is 91 hours per semester which consists of 100 minutes lectures, 120 minutes structured activities, and 120 minutes individual study per week for 16 weeks.
Credit points:	2 SKS (3.25 ECTS)
Prerequisites course(s):	
Course Outcomes	At the end of this course students should be able to: 1) Analyse matrices, matrix determinants, vector spaces, linear transformations, orthogonality and self-assessment problems. 2) Prove basic statements of standard linear algebra in a mathematically precise manner.

<table>
<tr><td></td><td>3) Apply the theory developed in the lectures to solve physics problems</td></tr>
<tr><td>Content:</td><td>Many physical quantities, such as "force", "position", "velocity", and "acceleration", have not only a magnitude but also a direction. Such quantities are called "vectors". A vector is often represented by an arrow of which the length is the magnitude, and the direction is the direction of the vector. Vectors may be added and be multiplied by numbers. A collection of vectors (together with these two operations) that satisfies certain rules (axioms) is called a vector space. It turns out that collections of certain objects that are different from three-dimensional arrows also satisfy these axioms. For instance, the set of all polynomials is also a vector space; the set of continuous functions on the real numbers is a (yet another) vector space. Often a vector space generated by a finite number of its elements. Such a finite set of elements is called a "basis" of the vector space and the number of elements is called the "dimension" of the vector space. Within the context of vector spaces, (linear) operations that convert vectors into vectors play an important role. In the case of vector spaces having a finite dimension, such an operation can be represented by a "matrix". The course provides a mathematical study of the aforementioned concepts of Vector Spaces, Matrices, Determinants, Linear Transformations, Orthogonality, and Eigen-values</td></tr>
<tr><td>Study / exam achievements:</td><td>Course evaluation will be carried out through (1) weekly assignments, (2) midterm exam (written), and (3) final exam (written). Determination of final grade is as follows:

Final score = 35% assignments + 35% midterm exam + 30% final exam

The final score then converted into the grade as follows:

<table>
<tr><th rowspan="2">Final score</th><th colspan="2">Conversion</th></tr>
<tr><th>Grade</th><th>Points</th></tr>
<tr><td>86 – 100</td><td>A</td><td>4.00</td></tr>
<tr><td>81 – 85</td><td>A-</td><td>3.67</td></tr>
<tr><td>76 – 80</td><td>B+</td><td>3.33</td></tr>
<tr><td>71 – 75</td><td>B</td><td>3.00</td></tr>
<tr><td>66 – 70</td><td>B-</td><td>2.67</td></tr>
<tr><td>61 – 65</td><td>C+</td><td>3.33</td></tr>
<tr><td>56 – 60</td><td>C</td><td>2.00</td></tr>
<tr><td>41 – 55</td><td>D</td><td>1.00</td></tr>
<tr><td>0 – 40</td><td>E</td><td>0.00</td></tr>
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	For passing this course, students must obtain grade D or higher.
Forms of media:	Board and LCD Projector
Literature:	Steven J. Leon, 2015, Linear Algebra with Applications, 9th Edition, University of Massachusetts, Dartmouth

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CO1		✓						
CO2		✓						
CO3					✓			