



**UNIVERSITAS INDONESIA**  
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### MODULE HANDBOOK

Module designation	<i>Elementary Linear Algebra</i>
Semester(s) in which the module is taught	<i>1</i>
Person responsible for the module	<i>Dra. Siti Aminah, M.Kom.</i>
Language	<i>Indonesian</i>
Relation to curriculum	<i>Compulsory</i> <i>The module is shared with Statistics and Actuarial Science undergraduate study programs</i>
Teaching methods	<i>Lecture, lab works</i>
Workload (incl. contact hours, self-study hours)	<i>(Estimated) Total workload: 6 hours/week x 14 weeks + 3.67 hours/week x 2 weeks = 91.34 hours.</i> <i>Contact hours: 2 hours (100 minutes lectures).</i> <i>Private study including examination preparation, specified in hours<sup>1</sup>:</i> <i>2 hours structured activities and 2 hours individual study per week.</i>
Credit points	<i>2 SKS (3.18 ECTS)</i>
Required and recommended prerequisites for joining the module	<i>-</i>

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<sup>1</sup> When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p>Module objectives/intended learning outcomes</p>	<p><i>After completing the course, students have the ability</i></p> <ol style="list-style-type: none"> <li>1. <i>To explain the basic concepts of system of linear equations</i></li> <li>2. <i>To calculate the solution of a system of linear equations using the Gauss elimination method and the Gauss Jordan elimination method</i></li> <li>3. <i>To explain the basic concept of matrix</i></li> <li>4. <i>To calculate the inverse matrix</i></li> <li>5. <i>To determine the standard matrix of a transformation</i></li> <li>6. <i>To apply the concept of a linear system to some simple problems in several fields of science</i></li> <li>7. <i>To calculate determinants of matrices</i></li> <li>8. <i>To explain the vector space concept of <math>R^n</math></i></li> <li>9. <i>To solve the <math>R^2</math> and <math>R^3</math> geometry problem</i></li> <li>10. <i>To determine eigenvalue and eigenvector of a matrix</i></li> </ol>
<p>Content</p>	<ol style="list-style-type: none"> <li>1. <i>Introduction to System of Linear Equations</i></li> <li>2. <i>Gaussian Elimination and Gauss Jordan</i></li> <li>3. <i>Matrices and Matrix Operation</i></li> <li>4. <i>Algebraic Properties of Matrix</i></li> <li>5. <i>Elementary Matrices and a Method for Finding <math>A^{-1}</math></i></li> <li>6. <i>More on Linear Systems and Invertible Matrices</i></li> <li>7. <i>Diagonal, Triangular, and Symmetric Matrices</i></li> <li>8. <i>Matrix Transformations</i></li> <li>9. <i>Applications of Linear Systems</i></li> <li>10. <i>Determinants by Cofactor Expansion</i></li> <li>11. <i>Evaluating Determinants by Row Reduction</i></li> <li>12. <i>Properties of Determinants; Cramer's Rule</i></li> <li>13. <i>Vectors in 2-Space, 3-Space, and n-Space</i></li> <li>14. <i>Norm, Dot Product, and Distance in <math>R^n</math></i></li> <li>15. <i>Orthogonality</i></li> <li>16. <i>The Geometry of Linear Systems</i></li> <li>17. <i>Cross product</i></li> <li>18. <i>Eigenvalue and Eigenvector</i></li> </ol>
<p>Examination forms</p>	<ol style="list-style-type: none"> <li>1. <i>Class activities : Quiz (written and computer-based), homework.</i></li> <li>2. <i>Lab sessions</i></li> <li>3. <i>Mid-term examination</i></li> <li>4. <i>Final examination</i></li> </ol>

<p>Study and examination requirements</p>	<p><i>The final mark will be weighted as follows:</i></p> <ol style="list-style-type: none"> <li>1. <i>Online Quiz (10%)</i></li> <li>2. <i>Homework (15%).</i></li> <li>3. <i>Written Quiz (10%)</i></li> <li>4. <i>Lab sessions (5%)</i></li> <li>5. <i>Mid-term examination (30%)</i></li> <li>6. <i>Final examinations (30%)</i></li> </ol> <p><i>To successfully pass the module it requires minimum 55% of the total mark.</i></p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;"><i>Mark</i></th> <th style="text-align: left;"><i>Grade</i></th> </tr> </thead> <tbody> <tr><td>85—100</td><td>A</td></tr> <tr><td>80—&lt;85</td><td>A-</td></tr> <tr><td>75—&lt;80</td><td>B+</td></tr> <tr><td>70—&lt;75</td><td>B</td></tr> <tr><td>65—&lt;70</td><td>B-</td></tr> <tr><td>60—&lt;65</td><td>C+</td></tr> <tr><td>55—&lt;60</td><td>C</td></tr> <tr><td>40—&lt;55</td><td>D</td></tr> <tr><td>&lt;40</td><td>E</td></tr> </tbody> </table>	<i>Mark</i>	<i>Grade</i>	85—100	A	80—<85	A-	75—<80	B+	70—<75	B	65—<70	B-	60—<65	C+	55—<60	C	40—<55	D	<40	E
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<p>Reading list</p>	<ol style="list-style-type: none"> <li>1. <i>Anton, Howard; Chris Rorres, Elementary Linear Algebra, 11<sup>th</sup>Ed, Applications Version, John Wiley, 2014.</i></li> <li>2. <i>Lecturer's Handout</i></li> <li>3. <i>Videos</i></li> </ol>																				