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MODULE HANDBOOK

Module designation	<i>Ordinary Differential Equations</i>
Semester(s) in which the module is taught	3
Person responsible for the module	<i>Dr. Dipo Aldila</i>
Language	<i>Indonesian</i>
Relation to curriculum	<i>Compulsory</i>
Teaching methods	<i>Lecture and lab works</i>
Workload (incl. contact hours, self-study hours)	<i>(Estimated) Total workload: 9 hours/week x 14 weeks + 5.5 hours/week x 2 weeks = 137 hours.</i> <i>9 hours/week divided into:</i> <ul style="list-style-type: none">- <i>Contact hours: 3 hours (150 minutes lectures).</i>- <i>Study independent including examination preparation, specified in hours¹: 3 hours structured activities and 3 hours individual study per week.</i>
Credit points	<i>3 SKS (4.77 ECTS)</i>
Required and recommended prerequisites for joining the module	<i>Calculus 2</i> <i>Elementary Linear Algebra</i>

¹ 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"> 1. <i>to distinguish different between ODE and PDE, linear and nonlinear ODE, and determine the order of ODE</i> 2. <i>to draw a phase portrait manually and using a software</i> 3. <i>to solve an initial value problem of a first order ODE analytically using a proper method</i> 4. <i>to solve an initial value problem of a second order ODE analytically using a proper method</i> 5. <i>to solve an initial value problem of a n^{th}-order ODE analytically using a proper method</i> 6. <i>to solve a second order of ODE using infinite series</i> 7. <i>to calculate a Laplace transform of a simple function, step function, impulse function and convolution integral</i> 8. <i>to solve a second order of ODE using Laplace transform</i> 9. <i>to solve a two-dimension linear system of ODE using concept of eigenvalues and eigenvectors</i> 10. <i>to solve a two-dimension nonlinear system of ODE using concept of eigenvalues and eigenvectors</i>
<p>Content</p>	<ol style="list-style-type: none"> 1. <i>Definition of ODE, PDE, linear and nonlinear ODE, and the order of ODE</i> 2. <i>Phase portrait</i> 3. <i>Solution of a first, and n^{th}-order of ODE</i> 4. <i>Solution of second order of ODE using infinite series</i> 5. <i>Laplace transform and its application to solve a second order of ODE</i> 6. <i>System of linear and nonlinear of an ODE</i>
<p>Examination forms</p>	<ol style="list-style-type: none"> 1. <i>Class activities : Quiz (written and computer-based), homework.</i> 2. <i>Lab sessions</i> 3. <i>Mid-term examination</i> 4. <i>Final examination</i>

<p>Study and examination requirements</p>	<p><i>The final mark will be weighted as follows:</i></p> <ol style="list-style-type: none"> 1. <i>Online Quiz (10%)</i> 2. <i>Homework (15%).</i> 3. <i>Written Quiz (10%)</i> 4. <i>Lab sessions (5%)</i> 5. <i>Mid-term examination (30%)</i> 6. <i>Final examination (30%)</i> <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><i>85—100</i></td> <td><i>A</i></td> </tr> <tr> <td><i>80—<85</i></td> <td><i>A-</i></td> </tr> <tr> <td><i>75—<80</i></td> <td><i>B+</i></td> </tr> <tr> <td><i>70—<75</i></td> <td><i>B</i></td> </tr> <tr> <td><i>65—<70</i></td> <td><i>B-</i></td> </tr> <tr> <td><i>60—<65</i></td> <td><i>C+</i></td> </tr> <tr> <td><i>55—<60</i></td> <td><i>C</i></td> </tr> <tr> <td><i>40—<55</i></td> <td><i>D</i></td> </tr> <tr> <td><i><40</i></td> <td><i>E</i></td> </tr> </tbody> </table>	<i>Mark</i>	<i>Grade</i>	<i>85—100</i>	<i>A</i>	<i>80—<85</i>	<i>A-</i>	<i>75—<80</i>	<i>B+</i>	<i>70—<75</i>	<i>B</i>	<i>65—<70</i>	<i>B-</i>	<i>60—<65</i>	<i>C+</i>	<i>55—<60</i>	<i>C</i>	<i>40—<55</i>	<i>D</i>	<i><40</i>	<i>E</i>
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<p>Reading list</p>	<ol style="list-style-type: none"> 1. <i>Boyce,W.E., DiPrima,R.C., Elementary Differential Equations and Boundary Value Problems, 9th edition, John Willey & Sons, 2008.</i> 2. <i>Bronson, R., Schaum's Easy Outline: Diffrential Equations, 4th Edition, McGraw-Hill, 2014.</i> 																				