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:	Computational Physics
Module level, if applicable:	Undegraduate
Code:	FSK6407
Sub-heading, if applicable:	-
Classes, if applicable:	-
Semester:	3th
Module coordinator:	Dr. Supardi, S.Si., M.Si.
Lecturer(s):	Dr. Supardi, S.Si., M.Si, Dr. Warsono, S.pd., M.Si
Language:	Bahasa Indonesia
Classification within the curriculum:	Compulsory Course
Teaching format / class hours per week during the semester:	200 minutes lectures and 240 minutes structured activities per week.
Workload:	Total workload is 181 hours per semester which consists of 200 minutes lectures, 240 minutes structured activities, and 240 minutes individual study per week for 16 weeks.
Credit points:	4 SKS (6.48 ECTS)
Prerequisites course(s):	-
Course Outcomes	After taking this course the students have ability to:

<table>
<tr><td></td><td>CO1. Students can explain the position of the Computational Physics method among other methods in studying Physics.
CO2. Students can apply the bisection, secant, and Newton-Raphson methods to determine the roots of a function.
CO3. Students can apply several numerical integration methods to approach integral functions.
CO4. Students can apply several numerical differentiation methods to solve differential equations.</td></tr>
<tr><td>Content:</td><td>This course discusses numerical computational methods for solving various problems that arise in Physics. This course covers basic concepts, including, i) determining the roots of a function using the bisection, secant, and Newton-Raphson methods, ii) the integral approximation of functions using the numerical integration method: trapezoid and Simpson 1/3, and iii) solving ordinary differential equations: finite difference approximation for derivatives, Euler method, Euler Cromer, and Runge-Kutta.</td></tr>
<tr><td>Study / exam achievements:</td><td>The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1, CO2, CO3 and CO4</td><td>a. Individual Assignment
b. Group Assignment
c. Mid
d. Final Exam</td><td>Presentation / written test</td><td>15%
15%
20%
25%
25%</td></tr>
<tr><td colspan="3"></td><td>Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Forms of media:</td><td>Board, LCD Projector, Laptop/Computer, online</td></tr>
<tr><td>Literature:</td><td>1. DeVries, P. L., 1994. A First Course in Computational Physics. New York: John Wiley & Sons
A. Chapra, S.C. dan Raymond, P. 1991. Metode Numerik Untuk Teknik:Terjemahan S.Sardy. Jakarta: Penerbit Universitas Indonesia.
Koonin, S.E. 1991. Computational Physics. California : Addison Wesley.</td></tr>
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PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CO1		✓						
CO2					✓			
CO3					✓			
CO4					✓			