Mathematical Physics I

Module Name :	Mathematical Physics I	
Module Level :	Undergraduate	
Code :	32254034	
Sub-heading, if applicable :		
Classes, if applicable :		
Semester :	3rd	
Module coordinator :	Dr. Teguh Budi Prayitno, M.Si	
Lecturer(s) :	Dr. Teguh Budi Prayitno, M.Si Prof. Mangasi Alion Marpaung, M.Si	
Language :	Indonesian	
Classification within the curriculum :	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class Size
Lecture (Expository, discussion, exercise)	200 minutes	40
Workload	Total workload of this course 181.3 hours (6 ECTS) per semester which consist of 90.6 hours (3 ECTS) classroom activity, 45.3 hours (1.5 ECTS) structured task, and 45.3 hours (1.5 ECTS) per semester.	
Credit points :	6 ECTS	
Prerequisite course(s) :	-	
Course Outcomes :	After taking this course the students have ability to: CLO84. Understand the mathematical concepts to solve physical problem. CLO85. Understand the special function that is almost used in physical problem. CLO86. Apply the boundary condition for differential equation. CLO87. Apply available method to solve differential equation.	
Content :	1. Complex Numbers (2 weeks) • Introduction to complex numbers • Complex plane • Euler's formula 2. Differential Equation (2 weeks) • Second-order differential equation • Solution with Boundary and initial conditions • Application of differential equation 3. Laplace Transform (2 weeks) • Definition of Laplace transform • Inverse Laplace transform	

<table>
<tr><td></td><td>
Convolution method
4. Linear Equation (1 weeks)
Operation of matrices
Linear functions and linear operators
Special matrices
5. Special Functions (2 weeks)
Definition of factorial function
Definition of beta function
Application of special functions
6. Series Solution of Differential Equations (3 weeks)
Frobenius method
Legendre polynomial
Bessel function
7. Eigen-value Problem (2 weeks)
Eigen value dan eigen vector
Diagonalization of matrix
Application of eigen-value problem
</td></tr>
<tr><td>Study/exam achievements:</td><td>Examination are conducted as unit test, as follows
<table>
<tr><th>No</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>Projects Assignment</td><td>Exploring and discussing some problem in mathematical physics</td><td>50%</td></tr>
<tr><td>2</td><td>Midterm Test</td><td>Written test</td><td>20%</td></tr>
<tr><td>3</td><td>Final Test</td><td>Written test</td><td>20%</td></tr>
<tr><td>4</td><td>Attendance</td><td>Presence list</td><td>10%</td></tr>
</table></td></tr>
<tr><td>Media :</td><td>Power point presentation, textbook, learning management system (LMS)</td></tr>
<tr><td>Literatures :</td><td>

M. L. Boas (2006) Mathematical Methods in the Physical Sciences, 3rd Edition, John Wiley & Sons Inc.
E. Kreyszig (2006) Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons Inc.
G. B. Arfken and H. J. Weber (2005) Mathematical Methods for Physicists, 6th Edition, Elsevier Academic Press.

</td></tr>
</table>