Mathematical Physics II

Module Name :	Mathematical Physics II	
Module Level :	Undergraduate	
Code :	32254044	
Sub-heading, if applicable :		
Classes, if applicable :		
Semester :	4th	
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: CLO104. Understand the concept of scalar and vector field. CLO105. Understand the periodic function and its applications. CLO106. Seek for the solution of partial differential equation with appropriate boundary conditions. CLO107. Understand the function of complex variables and its applications.	
Content :	1. Operators in Curvilinear Coordinates (2 weeks) • Operator in polar coordinates • Operator in cylindrical coordinates • Operator in spherical coordinates 2. Vector Analysis I (2 weeks) • Vector derivative • Scalar and vector fields • Divergence and curl 3. Vector Analysis II (2 weeks) • Line integral • Green theorem • Divergence and Stokes theorems	

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<tr><td></td><td>4. Fourier Series (1 week)
• Periodic functions
• Definition of Fourier series
• Sine and cosine Fourier series
5. Fourier Transforms (2 weeks)
• Definition of Fourier integral and its inverse integral
• Sine and cosine Fourier integral
• Application of Fourier integral
6. Partial Differential Equations (3 weeks)
• Laplace equation
• Diffuse equation
• Wave equation
7. Functions of Complex Variables (2 weeks)
• Analytical functions
• Contour integral
• Harmonic functions</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>1. M. L. Boas (2006) Mathematical Methods in the Physical Sciences, 3rd Edition, John Wiley & Sons Inc.
2. E. Kreyszig (2006) Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons Inc.
3. G. B. Arfken and H. J. Weber (2005) Mathematical Methods for Physicists, 6th Edition, Elsevier Academic Press.</td></tr>
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