UIN SUNAN KALIJAGA YOGYAKARTA
FACULTY OF SCIENCE AND TECHNOLOGY
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Undergraduate Programme in Physics

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MODULE HANDBOOK

Module Name	Mathematical Physics I
Module level, if applicable	Bachelor
Code, if applicable	FIS414002
Subtitle, if applicable	-
Courses, if applicable	Mathematical Physics I
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Anis Yuniati, M.Si., Ph.D.
Lecturer(s)	Anis Yuniati, M.Si., Ph.D.
Language	Indonesia
Relation to curriculum	compulsory course in the first year (1st semester) Bachelor Degree
Type of teaching, contact hours	200 minutes lectures and 240 minutes structured activities per week.
Workload	Total workload is 181.3 hours per semester, which consists of 200 minutes lectures per week for 14 weeks, 240 minutes structured activities per week, 240 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam
Credit points	4
Requirements according to the examination	Minimum attendance 75% All assignments submitted Attendance on time
Recommended prerequisites	Basic Mathematics
Module objectives/intended learning outcomes	After completing this course, the students: CO. 1 Able to understand the concept of infinite series, test the convergence of the series, extend the function into the form of infinite series CO. 2 Able to describe Fourier series of sine cosine and exponential forms, understand Fourier transform CO. 3 Able to understand complex numbers and functions of complex variables and use them in physics problems CO. 4 Able to solve a system of linear equations and understand the concept of linear combination CO. 5 Able to understand the concepts of matrix, determinant, diagonalisation, integral transformation, and coordinate system CO. 6 Able to understand the concept of vector analysis, calculate the gradient of rotational divergence, describe the Gauss theorem Stokes theorem and divergence theorem
Content	1. Infinite series, Power series, Convergence test, Convergence interval, Extension of functions to power series form 2. Algebra and Complex functions 3. Fourier series

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<tr><td></td><td>
4. Integral Transformation (Laplace Transformation, Fourier Transformation), Convolution, Green's function, Solution of differential equations by transformation
5. System of Linear Equations, Matrix, Determinant
6. Vector Analysis, Field, Gradient, Divergence, Rotation
7. Green's Theorem, Stokes Theorem, Gauss Theorem
8. Eigenvalues and Eigenvectors, Diagonalisation
9. Coordinate transformation, Linear transformation, Orthogonal Transformation, Curvilinear Coordinates
10. Tensor, Cartesian Tensor, Spherical Tensor
</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>
The final mark will be weighted as follows:
<table>
<tr><th>NO</th><th>Assessment methods (components, activities)</th><th>Weight (percentage)</th></tr>
<tr><td>1</td><td>Final Examination</td><td>40%</td></tr>
<tr><td>2</td><td>Mid-Term Examination</td><td>30%</td></tr>
<tr><td>3</td><td>Class Activities : Quiz, Homework, etc.</td><td>30%</td></tr>
</table>
The final assessment is expressed in the form of a letter value converted from a number value with the following categories:
<table>
<tr><th>NO</th><th>Number Value</th><th>Letter Value</th><th>NO</th><th>Number Value</th><th>Letter Value</th></tr>
<tr><td>1</td><td>≥ 95</td><td>A</td><td>7</td><td>65-69.99</td><td>B/C</td></tr>
<tr><td>2</td><td>90-94.99</td><td>A-</td><td>8</td><td>60-64.99</td><td>C+</td></tr>
<tr><td>3</td><td>85-89.99</td><td>A/B</td><td>9</td><td>55-59.99</td><td>C</td></tr>
<tr><td>4</td><td>80-84.99</td><td>B+</td><td>10</td><td>50-54.99</td><td>C-</td></tr>
<tr><td>5</td><td>75-79.99</td><td>B</td><td>11</td><td>55-34.99</td><td>D</td></tr>
<tr><td>6</td><td>70-74.99</td><td>B-</td><td>12</td><td><35</td><td>E</td></tr>
</table>
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<tr><td>Media employed</td><td>Whiteboard, markers, LCD projector, laser pointer, power point presentation, laptop/PC</td></tr>
<tr><td>Reading list</td><td>
1. Mathematical Methods in The Physical Sciences, Mary L. Boas, 3rd edition, John Wiley & Sons
2. Mathematical Methods For Physicist, George B. Arfken and Hand J. Weber, 7th edition, Academic Press
3. Mathematical Methods For Physics and Engineering, K.F.Riley, M.P.Hobson, and S.J.Bence, 3rd edition, Cambridge University Press
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PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			√						
CO 2			√						
CO 3			√						
CO4				√					
CO5				√					
CO 6				√					