FI240 Mathematical Physics II

Module name:	Mathematical Physics II	
Module level, if applicable:	Undergraduate	
Code:	FI240	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	3rd	
Module coordinator:	Andi Suhandi	
Lecturer(s):	Andi Suhandi	
Language:	Bahasa Indonesia	
Classification within the curriculum:	Compulsory Course	
Type of Teaching	Contact hours per week during the semester	Class Size
1. Lecture (conceptual, contextual, and problem-solving approaches through expository, discussions and exercises). 2. Structured activities (assignments based on conceptual, contextual, and problem-solving approaches) 3. Self-study (reading literature)	3 hours 20 minutes	35
Workload:	The total workload is 181 hours 20 minutes (6.4 ECTS) per semester, consisting of 40 hours/2400 minutes lectures (1.41 ECTS), 56 hours/3360 minutes structured activities (1.98 ECTS) and 56 hours/3360 minutes self-study (1.98 ECTS) per week for 12 weeks, 29 hour 11 minutes for four exams (1.03 ECTS)	
Credit points:	6.4 ECTS	
Pre-requisites course(s):	FI120 Basic Mathematics, FI222 Mathematical Physics I	
Course Learning Outcomes (CLO):	After taking this course the students have ability to: CLO1: Explain vector quantities, notations, and terminology, as well as examples in physics. CLO2: Apply vector addition, multiplication of vector quantities, differentiation of vector quantities, and integration of vector quantities. CLO3: Apply conceptual and procedural knowledge about solving a problem of integration of a function by using various special functions in the integral form. CLO4: Apply conceptual and procedural knowledge about solving a problem using Legendre polynomials, Legendre series, various forms and types of Bessel functions, Hankel functions, Laguerre polynomials and Hermite polynomials.	

<table>
<tr><td></td><td>CLO5: Apply conceptual and procedural knowledge about the use of various partial differential equations, Laplace equation, diffusion equation, and wave equation in the study and analysis of a relevant physical phenomenon.
CLO6: Apply conceptual and procedural knowledge about the use of various mathematical operations of complex numbers.
CLO7: Apply conceptual and procedural knowledge about the use of complex variable functions in solving the relevant problem.
CLO8: Apply conceptual and procedural knowledge of integral transforms, Laplace transforms, Fourier transforms, convolutions, Parseval theorem, inverse Laplace transforms (Bromwich Integral), delta Dirac functions, and Green-functions.</td></tr>
<tr><td>Content:</td><td>Vector Analysis, Special Functions-1 (Gamma, Beta, Error, Zeta-Riemann Function, Stirling's Formula, and Elliptic Integral), Special Function-2 (Legendre Polynomials, Bessel Function, Lagguere Polynomial, Hermite Polynomial), Partial Differential Equations, Complex number, Function of a Complex Variable, and Integral Transforms.</td></tr>
<tr><td>Study/exam achievements:</td><td>The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CLO</th><th>Assessment Object</th><th>Assessment Techniques</th><th>Weight</th></tr>
<tr><td>1</td><td>1 – 8

1 – 2
3 – 4
5 – 6
7 – 8</td><td>Subject specific competences:
a. Individual assignments
b. Exam:
- Exam 1
- Exam 2
- Exam 3
- Exam 4</td><td>

Written

Written test
Written test
Written test
Written test</td><td>

20%

20%
20%
20%
20%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Forms of media:</td><td>Board, LCD Projector, Laptop/Computer, LMS</td></tr>
<tr><td>Literature:</td><td>1. Boas, M. L. (2015). Mathematical methods in the physical sciences. Wiley.
2. Farlow, S. J., (2006), An Introduction to Differential Equations and Their Applications, Dover Publications.
3. Jain, M. C. (2018). Vector spaces, matrices and tensors in physics. Alpha Science International, Limited.
4. Blanchard, P., & Bruening, E. (2012). Mathematical Methods in Physics. Springer Science & Business Media.
5. Forinash, K. (2009). Mathematical methods in physics - partial differential equations, fouriers. A K Peters.
6. Neuenschwander, D. E. (2015). Tensor calculus for physics: a concise guide. Johns Hopkins University PressFarlow, S. J., (2006), An Introduction to Differential Equations and Their Applications, Dover Publications.</td></tr>
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PLO and CLO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	√											
CLO2	√											
CLO3	√											
CLO4	√											
CLO5	√											
CLO6	√											
CLO7	√											
CLO8	√											