



KEMENTERIAN PENDIDIKAN TINGGI,
SAINS, DAN TEKNOLOGI
UNIVERSITAS LAMPUNG

FAKULTAS KEGURUAN DAN ILMU PENDIDIKAN

Jalan Prof. Dr. Sumantri Brojonegoro No.1 Gedong Meneng - Bandar Lampung 35145

Telp./Fax: (0721) 704624 e-mail: fkip@unila.ac.id,

laman: <http://fkip.unila.ac.id>

Bachelor of Education in Physics

MODULE HANDBOOK

Module Name	Basic Physical Mathematics
Module Level, if Applicable	Bachelor
Code	KFI620103
Sub-Heading, (*if Applicable)	-
Classes, (*if Applicable)	-
Description	This compulsory course serves as a foundational support for other study program expertise courses. After completing this course, students are expected to master various mathematical methods and techniques and apply them to solve diverse physics problems. The main topics include complex numbers, ordinary and multiple integrals, matrices and determinants, partial derivatives, and ordinary differential equations. The course integrates Social Science Issues (SSI) by highlighting the impact of mathematical applications in real-world and societal contexts, such as technological advances and ethical considerations in science. Through TPACK (Technological Pedagogical Content Knowledge), students utilize tools like MATLAB and Wolfram Alpha (Technological Knowledge) to strengthen mathematical skills, while pedagogical strategies (Pedagogical Knowledge) enhance understanding of complex concepts. Additionally, the Nature of Science (NOS) is embedded to help students appreciate the role of mathematics in scientific modeling and inquiry, fostering a deeper understanding of mathematical and scientific epistemology.
Semester	2nd
Module Coordinator	Drs. I Dewa Putu Nyeneng, M.Sc.
Lecturers	Team Teaching of Basic Physical Mathematics
Language	Indonesian/English



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Classification With in the Curriculum	Study Program Compulsory Course
Teaching Format/Class Hours Per Week During the Semester	Learning activity can be carried out in the form of lecture or students' response: a. Face to face: 50 minutes/SKS b. Structured activity: 60 minutes/SKS c. Independent activity: 60 minutes/SKS
Teaching methods	In class activity : Case Study Structured activity : Group Discussion using Worksheet Independent activity : Individual task
Workload	1 CU (SKS) for bachelor degree equal to 3 work hours per week or 170 minutes. 3x50 minutes face to face, 3x60 minutes structured tasks, 3x60 minutes independent learning. for 16 weeks (including midterm and final exam), a total of 136 hours/semester. One CU equals to 1.51 ECTS
Credit Points	3 CU (SKS) = 3 x 1.51 = 4.53 ECTS
Prerequisites Courses	-
Course Outcomes (CO)	1. PLO 1 : Demonstrate knowledge of classical physics (mechanics, electrodynamics, thermodynamics, oscillations, waves and optics) and are familiar with the fundamentals of quantum, atomic and molecular, nuclear, elementary particle and solid state physics. 2. PLO 2 : Formulate physical systems using mathematics to solve physics problems. 3. CO1: Students are able to apply the formula of infinite series and rank series independently. 4. CO2: Students are able to apply complex number systems in Mechanics, Thermodynamics and Waves independently.



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	5. CO3: Students are able to applies the concepts of linear equations, matrices, and determinants in various physics problems independently. 6. CO4: Students are able to solve various physics problems with a system of partial differential equations independently. 7. CO5: Students are able to solve various physics problems with integral systems correctly and responsibly. 8. CO6: Students are able to solve various physics problems with vector analysis correctly and responsibly.
Content	1. Infinity series and rank series 2. Complex numbers 3. Linear equations, matrices, and determinants 4. Partial differential 5. Integral systems
Study/Exam Achievements	1. Participation Activities (5%) 2. Quizzes (25%) 3. Assignment (20%) 4. Final Semester Exam (25%) 5. Midterm exams (25%)
Examination Methods	1. Participation Activities The assessment for Participation Activities aims to assess the level of active involvement of students in the learning process. Participation activities include discussions, group work, presentations, and in-class interactions 2. Quizzes ● Quizzes is held at the end of the material ● Quizzes is a written test in the form of objective and essay, and carried out in the classroom with an implementation time of 120 minutes according to the module schedule



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	• Quizzes is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the module 3. Assigment • Assignments are given as individual tasks or group tasks and submitted in a limited time. • The assignments are carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the module. 4. Midterm Exam (UTS) • UTS is held at the 8th meeting • UTS is a written test in the form of objective and essay, and carried out in the classroom with an implementation time of 120 minutes according to the module schedule • UTS is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the module 5. Final Exam (UAS) • UAS is held at the 16th meeting • UAS is a written test in the form of objective and essay, and carried out in the classroom with an implementation time of 120 minutes which follows the UAS implementation schedule of the department • UAS is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the module.
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Forms of Media	LCD, whiteboard, and online resources
Literature	1. Bradbury, T. C. (1984). Mathematical Method with Applications to Problems in The Physical Sciences. 2. M. L. Boas. (2006). Mathematical Methods in the Physical Science, 3rd Edition.

