



UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF SCIENCE EDUCATION
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Bachelor of Education in Science

MODULE HANDBOOK

Module name:	Modern Physics
Module level, if applicable:	Undergraduate
Code:	IPA6241
Sub-heading, if applicable:	-
Classes, if applicable:	-
Semester:	6 th
Module coordinator:	Dr. Dadan Rosana, M.Si
Lecturer(s):	Dr. Dadan Rosana, M.Si
Language:	Bahasa Indonesia
Classification within the curriculum:	Compulsory Course
Teaching format / class hours per week during the semester:	100 minutes lectures and 120 minutes structured activities per week.
Workload:	Total workload is 90,67 hours per semester which consists of 100 minutes lectures, 120 minutes structured activities, and 120 minutes individual study per week for 16 weeks.
Credit points:	2 SKS (3 ECTS)
Prerequisites course(s):	-
Targeted learning outcomes:	After careful study of this chapter you should be able to do the following: CO1. Understand the concept of Reference point. CO2. define the Special and general theories of relativity. CO3. make Galileo conversions CO4. be knowledgeable about the propositions of relativity CO5. To establish a relationship between mass and energy CO6. Understand the Doppler Effect CO7. comprehend the particle properties of waves. CO8. Understand the wave properties of particles CO9. know the uncertainty principle. CO10. know the Atomic structure and development.

	CO11. Describe the series of spectra CO12. know Frank-Hertz experiment and. know the basic operating principle of the laser..										
Content:	The Modern Physics course is a compulsory subject for students elective course in Science Education. In this course, facilitated by lecturers, students will study; 1 Understand the concept of Reference point. 2 define the Special and general theories of relativity. 3 make Galileo conversions 4. be knowledgeable about the propositions of relativity 4.1. be knowledgeable about the concept of time dilation. 4.2. be knowledgeable about the concept of length contraction. 4.3. be able to Lorentz transformations. 4.4. Know the concept of relativistic mass 5 To establish a relationship between mass and energy 6 Understand the Doppler Effect 7 comprehend the particle properties of waves. 7.1. explain the Photoelectric effect, Compton effect and Couples. 7.2. know the quantum theory of light 7.3. Recognize the X-ray diffraction and Bragg's law. 8 Understand the wave properties of particles 8.1. Know the concept of the wave function 8.2. be knowledgeable about Particle diffraction (Davisson -Germer experiment). 8.3. know the behavior of particles in the box 9 know the uncertainty principle. 10 know the Atomic structure and development. 10.2. Know the Thomson and Rutherford atomic model. 10.3. Have information about the Bohr atom model. 10.5. Will learn the core of the movement 11.1. Describe the series of spectra 12.1. know Frank-Hertz experiment 12.2. know the basic operating principle of the laser.										
Study / exam achievements:	Attitude assessment is carried out at each meeting by observation and/or self-assessment techniques using the assumption that basically every student has a good attitude. The student is given a value of very good or not good attitude if they show it significantly compared to other students in general. The result of attitude assessment is not a component of the final grades, but as one of the requirements to pass the course. Students will pass from this course if at least have a good attitude. The final mark will be weight as follow: <table><tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr><tr><td>1</td><td>C01, C02, C03, C04, C05, C06 C07 C08</td><td>a. Individual Assignment b. Group Assignment c. Quiz d. Mid e. Final Exam</td><td>Presentation / written test</td><td>15% 15% 15% 25% 30%</td></tr></table>	No	CO	Assessment Object	Assessment Technique	Weight	1	C01, C02, C03, C04, C05, C06 C07 C08	a. Individual Assignment b. Group Assignment c. Quiz d. Mid e. Final Exam	Presentation / written test	15% 15% 15% 25% 30%
No	CO	Assessment Object	Assessment Technique	Weight							
1	C01, C02, C03, C04, C05, C06 C07 C08	a. Individual Assignment b. Group Assignment c. Quiz d. Mid e. Final Exam	Presentation / written test	15% 15% 15% 25% 30%							

	C09 C010 C011 And C012				
	Total			100%	
Forms of media:	Board, LCD Projector, Laptop/Computer				
Literature:	1. K. Krane, Modern Physics 3 rd ed, Wiley, 2012. 2. R. Harris, Modern Physics 2 nd ed., Pearson, 2008. 3. J. Bernstein, P. M. Fishbane, and S. Gasiorowicz, Modern Physics, Prentice Hall, 2000 4. Serway, Moses, and Moyer (2005). Modern Physics. Third Edition, Brooks/Cole.				

PLO and CO mapping

	PLO											
	Attitude			Knowledge				Spesific SKill				
	PLO1	PLO2	PLO3	PLO1	PLO2	PLO3	PLO4	PLO1	PLO2	PLO3	PLO4	PLO5
C01						✓	✓					
C02				✓		✓						
C03					✓	✓						
C04					✓		✓					
C05				✓			✓					
C06					✓	✓						
C07				✓	✓		✓					
C08				✓		✓	✓					
C09						✓						
C010				✓	✓		✓					
C011				✓	✓		✓					
C012				✓		✓	✓					