



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	Optics
Module Level, if Applicable	Bachelor
Code	KFI620208
Sub-Heading, (*if Applicable)	-
Classes, (*if Applicable)	-
Description	<p>This course covers the basic concepts of optics including light waves, properties of light, concepts of properties of light and their applications in everyday life. Through the integration of Social Science Issues (SSI) such as the use of cameras, laser camera devices, eyeglass lenses, telescopes, microscopes, and medical devices that use optical principles. In this course, students take lectures to form the competence of college participants in the field of TPACK utilization such as AI for science is for programming and Internet of Things (IoT) examinations, Arduino and Arduino Idea applications to create programming languages for project programs to be created, and Fritzing to design projects and examine robotic components from Arduino. The use of TPACK is to solve everyday life problems in physics that are integrated with social science issues (SSI) that have been mentioned. In the final project, students can develop and present projects such as digital optical props that illustrate the real state of the properties of light. At the end of the course, students are expected to be able to develop an appreciation of Nature of Science (NOS), by understanding how the concepts of light waves and optics. In addition, students will explore the importance of critical experiments in proving scientific theories and recognizing how the properties of light are in real life. This will strengthen students' understanding that scientific knowledge is a dynamic process and continues to evolve as technology advances and experiments become more sophisticated.</p>



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Semester	4th
Module Coordinator	Dr. Kartini Herlina, M.Si.
Lecturers	Individual Teaching of Learning Optics
Language	Indonesian/English
Classification With in the Curriculum	Study Program Compulsory Courses in the third year (4th semester) Bachelor Degree
Teaching Format/Class Hours Per Week During the Semester	Learning activity can be carried out in the form of : 1. Lecture or students' response a. Face to face : 50 minutes/SKS b. Structured activity : 60 minutes/SKS c. Independent activity : 60 minutes/SKS 2. Laboratory activity: 170 minutes/SKS
Teaching methods	In class activity : Team Based Project 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 for lecture or students' response. 2x50 minutes face to face, 2x60 minutes structured tasks, 2x60 minutes independent learning. 1 CU (SKS) for bachelor degree equal to 1 work hours per week or 170 for laboratory activity. for 16 weeks (including mid and final exam), a total of 136 hours/semester. One CU equals to 1.51 ECTS
Credit Points	3 (2-1) CU (SKS) = $3 \times 1.51 = 4.53$ ECTS
Prerequisites Courses	Waves
Course Outcomes (CO)	After completing this module, a student is expected to: 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.



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	<p>2. PLO-2 :Formulate physical systems using mathematics to solve physics problems.</p> <p>3. CO-1: Students are able to understand the characteristics of light propagating straight.</p> <p>4. CO-2: Students are able to understand the concept of light propagating straight and problems in everyday life.</p> <p>5. CO-3: Students are able to understand the concept of reflection of light and problems in everyday life.</p> <p>6. CO-4: Students are able to understand the concept of light refraction and problems in everyday life.</p> <p>7. CO-5: Students are able to understand the formulation of physical optical equations and their applications in everyday life problems.</p> <p>8. CO-6: Students are able to explain what is meant by interference in single or multiple slits.</p> <p>9. CO-7: Students are able to explain the concept of light diffraction and problems in everyday life.</p> <p>10. CO-8: Students are able to apply polarisation formalisation to problems in everyday life.</p>
Content	<p>Snellius law, Fresnell equation, Guide optics (rectangular cross section and coaxial transmission lines); polarisation which includes: types of polarisation (P State, L state, R State and E State), Polaroids and polarisers, polarisation by uniaxial materials; interference which includes: interference and coherence, interference with optical face splitting; interference which includes: interference and coherence, interference with optical face splitting.</p>
Study/Exam Achievements	<p>Midterm Exam 25%</p> <p>Final Exam 25%</p> <p>Practicum exam 20%</p> <p>Project Assignment 20%</p>



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	<p>Assignment 10%</p> <p>The initial cut - off points for grades A, B+ , B, C+ , C, and D should not be less than 85%, 80%, 75%, 70%, 65%, 60%, 55%, 50%, and 40%, respectively.</p>
Examination Methods	<p>1. Midterm Exam (UTS)</p> <ul style="list-style-type: none">✓ 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 Optics module <p>2. Final Exam (UAS)</p> <ul style="list-style-type: none">✓ 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 Optics module. <p>3. Practicum Exam</p>



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- ✓ Practicum exam is held once in one semester after all the topic of practicum done
- ✓ Practicum exam is used to assess student skills in using tools and reporting measurement results according to scientific rules
- ✓ Practicum exam is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Optics module.

4. Project Assignment

- ✓ Project assignment is given as group task in making some of simple experiment tools
- ✓ Project assignment is carried out for one semester and presented at the end of semester
- ✓ Project assignment is carried out to see the achievements of the PLO and CO which are in accordance with the characteristics of the Optics 1 module.

5. Assignments

- ✓ Assignments are given as exercise in each meeting in the form of worksheet and independent task



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	<ul style="list-style-type: none">✓ Assignments are about analyzing simple problems in physics and solving them with the concept of Optics✓ 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 Optics module
Forms of Media	E-learning, e-book, video, virtual lab**, e-journal, Arduino, Fritzing, AI for Science
Literature	<ol style="list-style-type: none">1. Moeller, K. D. (2020). Optics: Learning by Computing, with Examples Using Python (Edisi Ketiga)2. Chen, Z. (2021). Fundamentals of Optical Waves.3. Kanginan, Marthen (2013). Physics for SMA/MA Class X, Jakarta: Erlangga.4. Giancoli, Douglas C (2014). Physics-Principles With Applications. United States of America: Pearson Education, Inc.5. Serway, Raymond A. And Jewett, John W. (2014). Physics for Scientists and Engineers with Modern Physics. United States of America: Brooks/Cole Cengage Learning.6. Giodarno, Nicholas J (2010). College Physics-Reasoning and Relationships. Canada: Nelson Education, Ltd.



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PLO and CO Mapping

	PLO 1	PLO 2
CO 1	✓	
CO 2		✓
CO 3	✓	
CO 4	✓	
CO 5		✓
CO 6	✓	
CO 7	✓	
CO 8	✓	

