KEMENTERIAN PENDIDIKAN TINGGI,
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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,
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Bachelor of Education in Physics **MODULE HANDBOOK**

Module Name	Modern Optic
Module Level, if Applicable	Bachelor
Code	KFI620307
Sub-Heading, (*if Applicable)	-
Classes, (*if Applicable)	-
Description	Modern Optics provides a consolidation of classical optics and aspects of modern optics, covering the themes of geometric optics, physical optics, waveguides, lasers and non-linear optics. The Modern Physics course discusses the development of physics concepts including relativity theory, quantum mechanics, and particle physics that play an important role in understanding natural phenomena at the atomic and subatomic scales. By incorporating the concept of Socio-Scientific Issues (SSI), the course can be linked to contemporary issues, such as nuclear technology, renewable energy, and nanotechnology, to raise students' awareness of the social and ethical implications of the application of physics in real life. The lecturer integrates technology and interactive learning methods, such as quantum simulation or graphical visualization of relativity effects, to facilitate the understanding of abstract concepts. In addition, understanding the Nature of Science (NOS), which includes the tentative, empirical, and creative nature of physical science, provides students with a framework for critical thinking in viewing the development of theories and experiments in Modern Physics. Thus, these three approaches not only enrich students' learning experience, but also enhance their understanding of the role of physics in technological advancement and its influence on society.
Semester	5rd

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Module Coordinator	Dr.Kartini Herlina, M.Si
Lecturers	Team Teaching of Modern Optic
Language	Indonesian/English
Classification With in the Curriculum	Study Program Elective Courses in the third year (5^{th} semester) Bachelor Degree
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 : Lecture and discussions. Structured activity : Group Discussion using Independent activity : Individual Task
Workfload	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 explain the differences between flat mirrors and curved mirrors, as well as identify the properties of shadows produced by mirrors, mention and explain the types and

	properties of lenses and can paint the course of light and explain the working principles of optical devices. 4. CO2 Students are able to master the concepts of interference and diffraction, the concepts of polarization and disperse 5. CO3 Students are able to distinguish light and laser light, calculate the rate of transition of atoms and or molecules, and calculate the amount of energy resulting from the transition of atoms and or molecules. 6. CO4 Students are able to explain the concept of waveguides, their properties, and their uses. 7. CO5 Students are able to understand and explain the concept of difference between linear and non-linear optics, explain the non-linear medium, explain the concept of SHG, Pockel effect, Kerr effect, Faraday effect and design a simple experiment of one of its applications.
Content	1. Optics geometry 2. Optical tools 3. Physical Optics 4. Lasers 5. Waveguide 6. Non-linear optics
Study/Exam Achievements	Participants are evaluated based on ; 1. Participation Activities (15%) 2. Assignment (30%) 3. Final Semester Exams (30%) 4. Midterm exams (25%) 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

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Examination Methods	**1. Midterm Exam (UTS)** ✓ UTS is held at the 9th 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 Earth and Space Science module **2. 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 Earth and Space Science module. **3. Assignments** ✓ Assignments are given as exercise in each meeting in the form of worksheet and independent task ✓ Assignments are about analyzing simple problems in physics and solving them with the concept of Earth and Space Science ✓ 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 Earth and Space Science module
Forms of Media	LCD, whiteboard, and online resources
Literature	1. Gerd Keesser , “Optical Fiber Comunication” 2. Haliday and Resnick , Physics 2

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	3. Hecht, “Optics” 4. Jenkins and White, “Optics” 5. O Swelto, “Principles of Laser”, Plenum Press, 2nd edition , New York, 1982 6. Pedrotti, “Introduction to Optics” 7. Pedrotti, F. L., Pedrotti, L. S., & Pedrotti, L. M. (2017). *Introduction to Optics* (3rd ed.). Cambridge University Press. 8. Lipson, A., Lipson, S. G., & Lipson, H. (2010). *Optical Physics* (4th ed.). Cambridge University Press.

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PLO and CO Mappimg

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
CO 1	✓										
CO 2	✓										
CO 3	✓	✓									
CO 4	✓										
CO 5	✓	✓									