

Module Handbook of Fundamental Physics

Module designation	Fundamental Physics courses for students at the Faculty of Agriculture that examine the phenomena of kinematics and dynamics of motion, fluid mechanics, temperature, and heat as well as phase changes of substances, and the laws of thermodynamics. After studying this course, students are expected to have a complete understanding of the basics of physics and its applications, both in advanced course and to understand a number of scientific phenomena in various everyday lives, including those related to agriculture.
Semester(s) in which the module is taught	First Semester
Person responsible for the module	Dr. Sunarta, M.S.
Language	Bahasa Indonesia/Indonesian Language
Relation to curriculum	<i>Compulsory Course</i>
Teaching methods	Lecture are conducted in the class with 80-100 students. In every meeting, there will be delivered interactive lecture and discussion. In some topics there will be quizzes, individual and/or group assignment. Details: 1. Lectures 2. Assignment (Individual and Group) 3. Discussion 4. Midterm 5. Final Exam
Workload (incl. contact hours, self-study hours)	- Lectures = 2 SKS x 50 minutes x 16 meetings = 1.600 minutes = 26,67 hours = 26,67 hours/30hours = 0,89 ECTS - Assignment = 2 SKS x 60 minutes x 16 meetings = 1.920 minutes = 32 hours = 32 hours/30hours = 1,07 ECTS - Self Study = 2 SKS x 60 minutes x 16 meetings = 1.920 minutes = 32 hours = 32 hours/30hours = 1,07 ECTS Total Workload = 3,03 ECTS
Credit points	<i>2/0 Credit Points</i>
Required and recommended prerequisites for joining the module	<i>None</i>

<p>Module objectives/intended learning outcomes</p>	<p><i>Program Learning Outcomes (PLO):</i></p> <p><i>PLO1: Able to explain theoretical concepts of biology microorganism and develop microbial-based technology to increase plant production and environmental services.</i></p> <p><i>PLO2: Able to describe the latest methodology in the field of microbiology to create environmentally friendly and sustainable agricultural development.</i></p> <p><i>PLO3: Able to select, utilize and manage the potential of microbes and microbiomes to build industrial and agricultural systems</i></p> <p><i>Course Learning Outcomes (CLO):</i></p> <p><i>CLO1: Able to explain the basics of physics and key vocabulary to describe them: kinematics, dynamics, work and energy, fluid mechanics, temperature and heat, phase changes of substances due to heat, the laws of thermodynamics.</i></p> <p><i>CLO2: Able to observe, interpret, reason, and formulate questions as a way to learn new knowledge.</i></p> <p><i>CLO3: Practice understanding basic physics concepts in general real-world situations. Including matters related to agriculture.</i></p>
<p>Content</p>	<ol style="list-style-type: none"> 1. <i>Physics and Measurement: Introduction to physics, International Units (IU), theory of error, significant figures, syllabus (1 meeting)</i> 2. <i>Kinematics: Vector analysis, velocity, acceleration, and examples of free fall motion models, vertical motion, analysis of motion models, parabolic motion, rotational motion and rotational graph analysis. (2 meeting)</i> 3. <i>Dynamics: Newton's laws I, II, and III, application to the motion of systems of bodies, translational equilibrium law, center of mass, moment of inertia, rotational motion, rotational equilibrium. (2 meetings)</i> 4. <i>Work and Energy Theorem: Conservation of work and energy, collisions (1 meeting)</i> 5. <i>Static Fluid Mechanics: Mass density of fluids, hydrostatic pressure and its applications (1 meetings)</i> 6. <i>Dynamic Fluid Laws: The law of continuity, Bernoulli's law, and everyday applications (1 meetings)</i> 7. <i>Applied fluid mechanics: Analysis of flow velocity measurements with venture pipes, distribution channel analysis of water reservoirs (1 meeting)</i> 8. <i>Heat: Temperature and measuring instruments, the laws of thermodynamics and analysis of the process of heat conduction in a conductor, analysis of convection and heat radiation in a substance (3 meeting)</i> 9. <i>Group Presentation (2 meeting)</i>
<p>Examination forms</p>	<p><i>High Order Thinking Skills Examination</i></p>
<p>Study and examination requirements</p>	<p><i>To be able to take the final exams, the minimum of student attendance is 70% out of effective meetings. From 14 meetings, students must take a minimum of 10 meetings to take the exam.</i></p>

Reading list

Main References:

1. *Lecture Module "Basic Physics I"*
2. *Lecture Module "Measurement Methods"*
3. *Lecture Module "Physical Measurement Methods"*
4. *Lecture Module "Graphic Analysis Methods"*