

Fundamental of Physics
SE 202- 3 Credits
1st Semester IPSE

Description

Fundamental of Physics is a compulsory course and aimed to provide student competencies on physics. It is expected that students are not only able to understand fundamental on physics both are concepts and basic practices but also expand and apply to shape their critical thinking in scientific purposes. The course content consist of: physical science overview, vectors, properties of mechanics, matters, heat, waves, sounds, electricity, magnetism, optics and an overview on another new physics such as modern physics as optional one. Inquiry and concept approaches (and more suitable one) are applied with individual and group assignment, class-lab reports, middle and final test are used as evaluation instruments. The references such as Fundamental of Physics by Halliday-Resnick and Conceptual Physics by Paul G Hewitt are used, with others references as enrichment.

Syllabus

1. Course Identity

- | | |
|-------------------|--|
| a. Name | : Fundamental of Physics |
| b. Code | : SE 202 |
| c. Credit (s) | : 3 |
| d. Grade | : 1 st grade, on 1 st semester |
| e. Classification | : GSC (General Science Courses) |
| f. Program | : IPSE-FPMIPA UPI/ S-1 |
| g. Statue | : compulsory |
| h. prerequisite | : - |
| i. Lecturer | : Arif Hidayat, S.Pd., M.Si. |

2. Goal

Soon after completed the class, it is expected students should be able to understand fundamental on physics, both are concepts and basic practices, and also to expand and apply it to shape their critical thinking in scientific purposes.

3. Content

The courses will explore the basic principles about: physical science overview (measurements, scientific method, physics as science-fundamental), vectors (properties and operation), properties of mechanics (kinematics and dynamics), matters (atomic matters, 3 common type of matters, plasma) heat (temperature and expansion, heat transfer, phases-changing, and introduction to the thermodynamics) vibration and waves, sounds, electricity (static and dynamic electricity), magnetism (properties of magnetism electromagnet induction), optics (lights, colors, reflection and refraction, light waves, light emission, and light quanta), and an overview on another new physics such as modern physics (optional) (atomic physics inventions, atomic nuclei, radioactivity, fission and fusion).

4. Learning Activities

- Method(s) : Thematically classroom-lab activities, demonstration will be applied to enrich expository methods, meaningful speech, focused-group discussion.

- Approach(s) : inquiry and constructivism approaches
- Assignment : individual and group reports
- Media : learning software, power point slides by LCD, lab-class activities by lab equipment and demonstration apparatus.

5. Assessment

- Individual and group assignment (20%)
- Class-lab reports (25%)
- Middle (25%) and final test (30%) is a must.

6. Meeting's Agenda:

- 1st Meeting : Introduction on Physical Sciences, physics as one of fundamental science. First individual assignment
- 2nd Meeting : Mechanics, kinematics and dynamics, 1st Class-Lab Activities concerned to the Kinematics and Dynamics
- 3rd Meeting : Dynamics Review on 1st Class-Lab Activities concerned to the Kinematics and Dynamics.
- 4th Meeting : Properties of Matters. 2nd Class-Lab Activities concerned to the Matters.
- 5th Meeting : Gaseous and Plasma. 2nd Class-Lab Activities concerned to the Matters
- 6th Meeting : Heat. 3rd Class-Lab Activities concerned to temperature and heat.
- 7th Meeting : The Law of Thermodynamics. Review on 4th Class-Lab Activities concerned to the Thermodynamics.
- 8th Meeting : Vibration and Waves (simple pendulum vibration) and its properties 4th Class-Lab Activities concerned to the Thermodynamics.
- 9th Meeting : Sounds and its. 5th Class-Lab Activities on Waves and Sounds
- 10th Meeting : Electrostatics. Review on 5th Class-Lab Activities on Waves and Sounds.
- 11th Meeting : Electrodynamics. 6th Class-Lab Activities on Electricity and Magnetism.
- 12th Meeting : Magnetism. Review on 6th Class-Lab Activities on Electricity.
- 13th Meeting : Electromagnetic induction
- 14th Meeting : Light Optics. 7th Class-Lab Activities on Optics
- 15th Meeting : Reflection and Refraction. 7th Class-Lab Activities on Optics
- 16th Meeting : Atomic Physics and Nuclei Physics. Simulation concerned to Atomic Physics

7. References

Main Sources:

Halliday and Resnick, (2006). *Fundamental of Physics*, 7th Edition. New York: Mc Graw-Hills

Hewitt, P.G. (1993). *Conceptual Physics*, 7th edition, New York: Harper Collins College Publishers

Others:

Tipler. (2005). *Physics*, 5th edition, _____: McGraw-Hills

Giancoli, (2005). *Physics*. 4th edition. _____: McGraw-Hills