

Course	Course Name : Physics 1
	Course Code : SF184101
	Credit : 4
	Semester : 1

COURSE DESCRIPTION

Students will learn to understand the basic law of physics, Particle kinematics; Particle dynamic; Work and energy; Rotation; Friction and Fluid mechanics, with simple mathematic equations also to introduce applying the concept, and do an analysis in **practical work**. The practical works include physical pendulum, mathematical pendulum, spring constant, fluid viscosity, projectile motion, frictional force, rotational inertia.

COURSE GRADUATE LEARNING OUTCOME

1. Work together to get the most potential advantage that owned.
2. Understanding the concept of classical physics and modern physics in depth.
3. Understanding operational knowledge about the function operating the common physics instrument, data analysis, and information from those instruments.
4. Able to formulate physical symptoms and problems through the analysis of the result observation and experiments.

COURSE LEARNING OUTCOME

1. Understanding physical quantities and systems of the unit, graphically and mathematically also the application.
2. Understanding the basic principle of Newton's law and kind of force also the application
3. Understanding the concept of work and energy, mechanical energy, conservation of mechanical energy, and the application
4. Applying the concept of impulse and momentum, conservation of momentum, collision and the application
5. Understanding the principle of rigid body motion and rotational motion the application
6. Understanding the concept of rigid equilibrium also the application
7. Understanding the mechanism things change shape and elasticity also the application.
8. Understanding simple harmonic motion, superposition 2 motion also the application.
9. Understanding the concept of hydrostatic and hydrodynamic also the application.

TOPIC

Particle kinematics: Displacement, velocity, acceleration, straight motion, curvilinear motion (parabola and circular); relative motion.

Particle dynamic: Newton's Law I, II and III, kind of force (gravitational force, weight, tension, normal force, frictional force and spring force), the equilibrium of the force, applying Newton's Law I, II and III ;

Work and energy: concept of work, kinetic energy, potential energy (gravity and spring), work-kinetic energy theorem, conservation of mechanical energy,

Impulse and Momentum: impulse, momentum, collision (elastic and inelastic),;

Rotation dynamic: Angular displacement, angular velocity, angular acceleration, torque, the center of mass, net torque, rotational inertia, the kinetic energy of rotation, rotational motion, work and rotational kinetic energy (translation and rotation)

Friction: simple harmonic motion, energy in simple harmonic motion, physical pendulum, mathematical pendulum, torsion pendulum, combined of harmonic motion (parallel and standing);

Fluid mechanics: hydrostatic pressure, Pascal's principle, Archimedes principle, buoyant force, equation of continuity, Bernoulli's equation, viscosity.

REFERENCES

Main References :

1. Halliday, Resnic, Jearl Walker; 'Fundamental of Physics'. John Wiley and Sons, 10th ed, New York, 2014
2. Douglas C. Giancoli, 'Physics for Scientists and Engineers, Pearson Education, 4th ed, London, 2014
3. Tim Dosen, "Diktat Fisika I", Fisika FMIPA-ITS
4. Tim Dosen, "Soal-soal Fisika I", Fisika FMIPA-ITS
5. "Petunjuk Praktikum Fisika Dasar", Fisika, MIPA-ITS

Supporting References :

1. Sears & Zemanky, "University Physics", Pearson Education, 14thed, USA, 2016
2. Tipler, PA, 'Physics for Scientists and Engineers '6th ed, W.H. Freeman and Co, New York, 2008

PREREQUISITE

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