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

Description of Course	
<p>In this course, students will learn to understand the basic laws of physics, particle kinematics; Particle dynamics; Work and energy; Rotational motion; Vibration and fluid mechanics, through simple mathematical descriptions and introducing examples of the use of concepts, and analyzing material in the form of practicum.</p> <p>The practicum carried out includes physical pendulum, mathematical pendulum, spring constant, fluid viscosity, bullet motion, friction coefficient, moment of inertia.</p>	
Learning Outcome	
PLO-01	Able to apply Natural Sciences and Mathematics in the field of Biomedical Engineering.
PLO-03	Able to design and implement laboratory experiment and / or field experiments, analyze and interpret data, and use objective assessments to draw conclusions.
PLO-06	Able to apply the latest knowledge, skills and methods in solving problems in the field of Biomedical Engineering
Course Learning Outcome	

CLO 1	Students understand particles that compose a matter and it's electrical properties, substantial of conductor and dielectric
CLO 2	Students understand the strength of an electric field based on Coulomb force and Gauss's law.
CLO 3	Students are able to understand various forms of electric potential in charged conductors..
CLO 4	Students understand the capacitance principle of various form of capacitor in capacitor circuits, series, parallel and mixed.
CLO 5	Able to use magnetic field force formulas for electric currents and moving charges
CLO 6	Able to mention the role of magnetization in magnetic material and hysteresis loop.
CLO 7	Understand the principle of electromotive force emergences, and current in resistor, capacitor and inductor
CLO 8	Able to determine the magnitude of impedance, electric current and phase angle in parallel and series circuit R-L, R-C, RL-C

Main Subject

Quantities and vectors;

Particle kinematics: displacement, velocity, acceleration, straight motion, curved motion (parabolic and circular); relative motion.

Particle dynamics: Newton's Laws I, II and III, various forces (gravitational force, gravity, rope tension, normal force, friction and spring force), force balance, application of Newton's laws I, II and III;

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

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

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Rotational dynamics: Angular displacement, angular velocity and angular acceleration, force moment (torque), center of mass, balance of force moment, moment of inertia, rotational kinetic energy, rolling motion, energy conservation law (translation and rotation)

Vibration: simple harmonic motion, energy of simple harmonic motion, mathematical pendulum, physical pendulum, torsional pendulum, combination of harmonious vibrations (parallel and perpendicular);

Fluid mechanics: hydrostatic pressure, Pascal's principle, Archimedes principle, surface tension, continuity equation, Bernoulli's equation, viscosity.

Prerequisites

Reference

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 Reference

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

