



INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)  
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS  
DEPARTEMEN TEKNIK ELEKTRO  
Program Studi Sarjana (S1) Teknik Telekomunikasi

1	<b>Nama Mata Kuliah</b> : Fisika Mekanika / <i>Mechanical Physics</i> <b>/ Course Name</b>
2	<b>Kode Mata Kuliah</b> : SF234102 <b>/ Course Code</b>
3	<b>Kredit / Credits</b> : 4 SKS
4	<b>Semester / Semester</b> : 1

#### Deskripsi Mata Kuliah / Course Description

Pada mata kuliah ini mahasiswa akan belajar memahami hukum-hukum dasar fisika, Kinematika partikel; Dinamika partikel; Kerja dan energi; Gerak rotasi ; Getaran dan Mekanika fluida, melalui uraian matematika sederhana serta memperkenalkan contoh pemakaian konsep, dan melakukan analisa materi dalam bentuk praktikum.

Praktikum yang dilakukan meliputi: (1)bandul fisis, (2)bandul matematis, (3)konstanta pegas, (4)viskositas cairan, (5)gerak peluru, (6)koefisien gesek, (7) momen inersia.

*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 conducting material analysis in the form of practicum.*

*The practicum includes: (1) physical pendulum, (2) mathematical pendulum, (3) spring constant, (4) fluid viscosity, (5) bullet motion, (6) friction coefficient, (7) moment of inertia.*

#### Capaian Pembelajaran Lulusan (CPL) Yang Dibebankan Mata Kuliah / Program Learning Outcomes Charged to The Course

1. (KU1) Menerapkan pemikiran logis, kritis, sistematis, dan inovatif dalam konteks pengembangan atau implementasi ilmu pengetahuan dan/atau teknologi sesuai dengan bidang keahliannya  
*(KU1) Applying logical, critical, systematic and innovative thinking in the context of the development or implementation of science and/or technology in accordance with the area of expertise*
2. (KU2) mampu menunjukkan kinerja mandiri, bermutu, dan terukur;  
*(KU2) is able to demonstrate independent, quality, and measurable performance;*

3. (S9) menunjukkan sikap bertanggung jawab atas pekerjaan di bidang keahliannya secara mandiri;  
*(S9) shows a responsible attitude towards work in their field of expertise independently;*

#### **Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes**

1. mampu menerapkan pemikiran logis, kritis, sistematis, dan inovatif dalam menyelesaikan masalah dan implementasi ilmu fisika I. / *able to apply logical, critical, systematic, and innovative thinking in solving problems and implementing physics I.*
2. mampu menunjukkan kinerja mandiri, bermutu, dan terukur / *able to demonstrate independent, quality, and measurable performance*
3. menunjukkan sikap bertanggung jawab atas pekerjaan di bidang keahliannya secara mandiri / *show responsibility for work in their field of expertise independently*

#### **Pokok Bahasan / Contents**

1. Besaran dan vektor: Besaran dasar, besaran turunan, satuan, konversi satuan, besaran skalar dan vektor, operasi matematika pada vektor secara geometris dan analitis / *Quantities and vectors: Basic quantities, derived quantities, units, unit conversions, scalar and vector quantities, mathematical operations on vectors geometrically and analytically*
2. Kinematika partikel: Pergeseran posisi, kecepatan, percepatan, gerak lurus, gerak lengkung (parabola dan melingkar); gerak relatif / *Particle kinematics: shifts in position, velocity, acceleration, straight motion, curved motion (parabolic and circular); relative motion.*
3. Dinamika partikel: Hukum Newton I, II dan III, macam-macam gaya (gaya gravitasi, gaya berat, gaya tegang tali, gaya normal, gaya gesek dan gaya pegas), kesetimbangan gaya, penerapan hukum Newton I, II dan III / *Particle dynamics: Newton's laws I, II and III, various forces (gravitational force, gravity, rope tension, normal force, frictional force and spring force), force balance, application of Newton's laws I, II and III*
4. Kerja dan energi: konsep kerja, energi kinetik, energi potensial (gravitasi dan pegas), teorema kerja energi, hukum kekekalan energi mekanik / *Work and energy: the concept of work, kinetic energy, potential energy (gravity and springs), work energy theorem, law of conservation of mechanical energy*
5. Impuls dan Momentum: impuls, momentum, tumbukan (elastis dan tidak elastis), / *Impulse and Momentum: impulse, momentum, collision (elastic and inelastic)*
6. Dinamika rotasi: Pergeseran sudut, kecepatan sudut dan percepatan sudut, momen gaya (torsi), pusat massa, kesetimbangan momen gaya, momen inersia, energi kinetik rotasi, gerak menggelinding, hukum kekekalan energi (translasi dan rotasi) / *Rotational dynamics: angular shift, angular velocity and angular acceleration, moment of force (torque), center of mass, balance of moment of*

*force, moment of inertia, rotational kinetic energy, rolling motion, law of conservation of energy (translation and rotation)*

7. Getaran: gerak harmonis sederhana, energi gerak harmonis sederhana, bandul matematis, bandul fisis, bandul puntir, gabungan getaran selaras ( sejajar dan tegak lurus) / *ibration: simple harmonic motion, simple harmonic motion energy, mathematical pendulum, physical pendulum, torsion pendulum, combination of harmonic vibrations (parallel and perpendicular);*
8. Mekanika fluida: tekanan hidrostatis, prinsip Pascal, prinsip Archimedes, tegangan permukaan, persamaan kontinuitas, persamaan Bernoulli, viskositas / *Fluid mechanics: hydrostatic pressure, Pascal's principle, Archimedes' principle, surface tension, continuity equation, Bernoulli's equation, viscosity.*

#### **Prasyarat / Pre-requisite**

#### **Pustaka / Reference**

Utama / Primary :

1. Sears & Zemanky, "University Physics", Pearson Education, 14th ed, USA, 2016
2. Douglas C. Giancoli, 'Physics for Scientists and Engineers, Pearson Education, 4th ed, London, 2014
3. Tim Dosen, " Fisika I", Fisika FMIPA-ITS
4. "Petunjuk Praktikum Fisika Dasar", Fisika, MIPA-ITS

Pendukung / Support :

1. Halliday, Resnic, Jearl Walker; 'Fundamental of Physics'. John Wiley and Sons, 10th ed, New York, 201
2. 4
3. Tipler, PA, 'Physics for Scientists and Engineers ',6th ed, W.H. Freeman and Co, New York, 2008