

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Physics

Physics 8.01x

Fall Term 2001

SYLLABUS

Text: H. D. Young and R. A. Freedman, *University Physics*, 10th Edition, Addison-Wesley, Reading Mass (2000).

Wednesday Sept 5 Lecture 1

Introduction to 8.01X, measurement standards
Hand out Experiment Flow, due September 14

Friday Sept 7 Lecture 2

Units, dimensions, Fermi problems
Hand out Problem Set 1, due Sept 14, hand out Red Boxes

Monday Sept 10 Lecture 3

Experiment Flow, error analysis

Wednesday Sept 12 Lecture 4

Kinematics: 1D motion, displacement and velocity
Hand out Project LVPS, due Sept 21

Friday Sept 14 Lecture 5

1D motion, velocity and acceleration
Hand out Problem Set 2, due Sept 21
Experiment Flow, Problem Set 1 due

Monday Sept 17 Holiday

Wednesday Sept 19 Lecture 6

Vectors, Newton's Laws of motion, force, mass and acceleration
Hand out Experiment FO, due Sept 28

Friday Sept 21 Lecture 7

Newton's Laws of motion, force, mass and acceleration
Hand out Problem Set 3, due Sept 28

Project LVPS, Problem Set 2 due

Monday Sept 24 Lecture 8

Newton's Laws, gravitation and weight, projectiles

Wednesday Sept 26 Lecture 9

Newton's Laws, normal forces and friction

Hand out Experiment MF, due Oct 12

Friday Sept 28 Lecture 10

Review, applications of Newton's Laws.

Experiment FO, Problem Set 3 due

Hand out Problem Set 4, due Oct 5

Monday Oct 1 QUIZ 1 In Class

Covers: fundamental concepts, Fermi problems, 1D kinematics, Experiment

Flow, Experiment FO, projectile motion, Newton's laws

Wednesday Oct 3 Lecture 11

Newton's Laws, spring forces, tension

Hand out Experiment CF, due Oct 19

Friday Oct 5 Lecture 12

Uniform circular motion

Problem Set 4 due

Hand out Problem Set 5, due Oct 12

Monday Oct 9 Columbus Day Holiday

Wednesday Oct 10 Lecture 13

Universal law of gravitation, planetary orbits

Friday Oct 12 Lecture 14

Levers, statics and torque

Problem Set 5, Experiment MF due

Hand out Problem Set 6, due Oct 19

Monday Oct 15 Lecture 15

Statics and torque

Wednesday Oct 17 Lecture 16

Work, kinetic energy

Friday Oct 19 Lecture 17

Conservation laws, potential energy

Problem Set 6, Experiment CF due

Hand out Problem Set 7, due Oct 26

Monday Oct 22 Lecture 18

Conservation of mechanical energy

Hand out Experiment ET, due Nov 2

Wednesday Oct 24 QUIZ 2 In Class

Covers: Newton's Laws, circular motion, static equilibrium

Friday Oct 26 Lecture 19

Energy: universal gravitation and planetary orbits

Problem Set 7 due

Hand out Problem Set 8, due Nov 2

Monday Oct 29 Lecture 20

Energy transformations, heat

Wednesday Oct 31 Lecture 21

Restoring forces and harmonic motion, pendulum

Friday Nov 2 Lecture 22

Linear momentum, impulse, Newton's 2nd Law

Experiment ET, Problem Set 8 due

Hand out Problem Set 9, due Nov 9

Monday Nov 5 Lecture 23

Momentum, center of mass

Wednesday Nov 7 Lecture 24

Momentum, collisions

Hand out Experiment VS, due Nov 16

Friday Nov 9 Lecture 25

Collisions, kinetic theory

Problem Set 9 due

Hand out Problem Set 10, due Nov 16

Monday Nov 12 Veteran's Day Holiday

Wednesday Nov 14 Lecture 26

Angular momentum, torque

Hand out Experiment AM, due Nov 30

Friday Nov 16 Lecture 27

Moment of inertia, rigid bodies

Problem Set 10, Experiment VS due

Hand out Problem Set 11, due Nov 30

Monday Nov 19 QUIZ 3 In Class

Covers: Energy, momentum, conservation laws, collisions

Wednesday Nov 21 Lecture 28

Rotational dynamics

Friday Nov 23 Thanksgiving Holiday

Monday Nov 26 Lecture 29

Angular dynamics, translation and rotation

Wednesday Nov 28 Lecture 29

Properties of materials, solids

Friday Nov 30 Lecture 30

Properties of materials, fluids

Experiment AM, Problem Set 11 due

Hand out Problem Set 12, due Dec 7

Monday Dec 3 Lecture 31

Conservation of flow, viscosity

Wednesday Dec 5 Lecture 32

Viscosity, buoyancy

Friday Dec 7 Lecture 33

Gases, kinetic theory, ideal gases

Problem Set 12 due

Monday Dec 10 Lecture 34

Special relativity

Wednesday Dec 12 Lecture 35

Final review