A) COURSE

Course Id:	Course
0061	Physics A

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
3	2	3	8	80

A) GENERAL COURSE INFORMATION

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
Level:	I	I	I	I	I
Course Type (Required/Elective)	Required	Required	Required	Required	Required
Prerequisite Course:	No-one	No-one	No-one	No-one	No-one
CACEI Classification:	CB	CB	CB	CB	CB

C) COURSE OBJECTIVE

At the end of the course, the student will be capable of:
Gain a rational form of thought that will lead him to the understanding the mathematical concepts and expressions of the principles, Basic Laws of mechanics and their theoretical application that may serve him as a basis for higher courses.

D) TOPICS (CONTENTS AND METHODOLOGY)

1.- TOOLS OF PHYSICS	
Specific Objective:	The student: a) will learn the different systems and forms of measurement that will lead him to establish the equivalences among the measurement systems b) will be able to carry out the vectorial operations of addition, subtraction, product in graph and in analytical form, so that he may mathematically deal with the vectorial quantities of Physics c) will analyze the concepts defined by kinematics, their link to the problems

1.1 INTRODUCTION 1.1.2 What is Physics 1.1.3 Essentials parts of Physics 1.1.4 Mechanics as a structural part of Physics 1.1.5 The parts of mechanics 1.2 MEASUREMENTS AND MEASURING SYSTEMS 1.2.1 What is measuring? 1.2.2 Physical quantities 1.2.3 Measuring patterns 1.2.4 Unit systems 1.2.5 Equivalence among fundamental systems 1.2.6 Applications 1.3 VECTORS 1.3.1 Definition of a vector 1.3.2 Vector addition 1.3.3 Vector subtraction 1.3.4 Product of a scalar multiplied by a vector 1.3.5 Unitary vectors 1.3.6 Vectors on a plane and in space 1.3.7 Components of a vector on a plane and in space 1.3.8 Magnitude and direction of a vector on a plane and in space 1.3.9 Scalar product and vector product 1.3.10 Applications 1.4 KINEMATICS 1.4.1 Particle, position and reference system 1.4.2 Determining position in scalar and vector form in two and three dimensions 1.4.3 Change in position, displacement and trajectory 1.4.4 Velocity and mid velocity 1.4.5 Speed 1.4.6. Instantaneous velocity 1.4.7 Mid and instantaneous acceleration

Readings and other resources	Readings to investigation of concepts, as well as to complement and strengthen the topics discussed in class.
Teaching methods	Exhibition topics by teacher and / or students; use of some didactic techniques like teamwork, learning based in problems and/or projects.
Learning activities	Exercise class and homework, as well as them respective interpretation of results.

2.- KINEMATICS IN ONE AND TWODIMENSIONS AND DYNAMICS	
Specific Objective:	The student: a) Will apply the concepts that KINEMATICS defines in one and two dimensions, their link regarding the problems being solved in the classroom and laboratory presented to him in his professional practice. b) Will describe the way in which the environment has an influence regarding the movement of parameters used for the quantitative determination, the principles and functional relations ruling them. c) Will employ the principles and functional relations of dynamics toward more common and specific environments. This will lead him to the solution of problems in his professional practice.

2.1 MOVEMENT IN ONE DIMENSION 2.1.1 Uniform straight-line movement with a constant acceleration 2.1.2 Graphic analysis of movement 2.1.3 Counter time position 2.1.4 Velocity vs. time 2.1.5 Acceleration vs. time 2.1.6 Free fall 2.1.7 Movement in two dimensions 2.1.8 Projectiles 2.1.9 Uniform Circular Movement 2.1.10 uniformly accelerated circular movement 2.11.1 Relative velocities 2.1.12 Applications 2.2. DYNAMICS 2.2.1 Fundamental Concepts of Dynamics 2.2.2 Surrounding, force, inertia 2.2.3 Laws of force 2.2.4 Laws of Newton 2.2.5 Applying Newton's Laws: with one body and with two or more bodies 2.2.6 Weight 2.2.7 Bodies Suspended in equilibrium (static) 2.2.8 Bodies on plane, horizontal and inclined surfaces 2.2.9 Two or more body systems 2.10 Circular movement (special case9 2.2.11 Forces of Friction 2.2.12 Applications

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3.- ENERGY AND ENERGY CONSERVATION	
Specific Objective:	The student: a) will recognize the influence that the environment has over the movement of bodies, which leads to establishing work as a fundamental measure of mechanical activity b) will reaffirm that another way of analyzing the interactions between the body and the environment is through the concept of Energy and the of Work- Energy Theorem

3.1 WORK 3.1.1 Scalar product between vectors 3.1.2 Work carried out by a constant force 3.1.3 Work carried out by a variable force 3.1.4 Applications 3.1.5 Work carried out by. 3.1.5.1 Gravitational field 3.1.5.2 Rubbing 3.1.5.3 A spring 3.2 WORK - ENERGY THEOREM 3.2.1 Definition and analysis 3.2.2 Applications 3.3 POWER 3.3.1 Definition and analysis 3.3.2 Applications 3.4 ENERGY CONSERVATION 3.4.1 Analysis of energy exchanges between the environment and a particle. 3.4.2 Potential energy 3.4.3 Definition of System 3.4.4 Conserving and non-conserving systems 3.4.5 Principles of energy conservation 3.4.6 Applications to Conserving and non-conserving systems 3.4.7 Spring -Mass system 3.4.8 Earth-particle system 3.4.9 Surface- particle System (rubbing)

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4.- MOMENTUM AND IMPETUS	
Specific Objective:	The student: a) Will recognize that a particle in movement has impetus (momentum), which changes on having a force applied to it. b) Will interpret the impulse and will be able to relate it with the change in momentum c) Will demonstrate that in a collision between a two-particle system the momentum will continue to conserve itself. d) Will employ this knowledge in problems regarding particle collisions e) Will employ all the concepts of particle kinematics to a system of particles.

4.1 IMPULSE AND MOMENTUM 4.1.1 Definition of impulse 4.1.2 Consequence of an impulse on a particle 4.1.3 Momentum 4.1.4 Impulse and change of momentum 4.2 Collisions 4.2.1 Collision between two particles 4.2.2 Principle of Momentum conservation 4.2.3 Analysis of collisions in one and two dimensions 4.2.4 Applications 4.3 MECHANICS OF A PARTICLE SYSTEM 4.3.1 Mass Center (definition) 4.3.2 Position of the mass center 4.3.3 Displacement of mass center 4.3.4 Velocity of the mass center 4.3.5 Acceleration of the mass center 4.4 DYNAMIC OF A PARTICLE SYSTEM 4.4.1 Internal forces 4.4.2 External forces 4.4.3 Newton's Second Law 4.4.4 Applications	
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Learning activities	Exercise class and homework, as well as them respective interpretation of results.

5.- UNIVERSAL GRAVITATION	
Specific Objective:	The student: a) Will recognize and understand two of the fundamental problems of movement in ancient time, the tendency of bodies to fall to the ground when dropped and the movement of the planets, sun and other stars. b) Will understand the fundamental facts of gravitation through the work of Newton that will help him reinforce his reasoning to correctly explain the daily life gravitational phenomena
5. Gravitation 5.1 Newton and the universal law of Gravitation 5.2 Gravitational constant 5.3 Gravity on the surface of the earth 5.4 Potential Gravity Energy 5.5 Planet and satellite movements 5.6 Universal gravitation 5.7 Applications	
Readings and other resources	Readings to investigation of concepts, as well as to complement and strengthen the topics discussed in class.
Teaching methods	Exhibition topics by teacher and / or students; use of some didactic techniques like teamwork, learning based in problems and/or projects.
Learning activities	Exercise class and homework, as well as them respective interpretation of results.

E) TEACHING AND LEARNING METHODOLOGIES

The Professor will impart daily one-hour long classes and will be at liberty to use, besides the blackboard, chalk and eraser, techniques from the new technologies, to reinforce and increase knowledge.

F) EVALUATION CRITERIA

Suggested Form of Evaluation and weighing	Schedule	Include	Weighing
First partial exam Exams 80% Homework or Research assignments 10% Participation and attendance 10%			25 %
Second partial exam Exams 80% Homework or Research assignments 10% Participation and attendance 10%			25 %
Third partial exam Exams 80% Homework or Research assignments 10% Participation and attendance 10%			25 %
Fourth partial exam Exams 80% Homework or Research assignments 10% Participation and attendance 10%			25 %
Total			100%
Ordinary exam			
Lab			
Extraordinary exam			
Title exam			
Regularization exam			

G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

MAIN BOOKS

- Resnick/ Halliday/Krane, Fisica Vol. I CECSA, 5a Edición México 2004
- Serway/Jewet. Física I. Thomson, 3a Edición México 2004
- Sears/Zemansky/Young/Freedman. Física Universitaria Vol. I. Pearson-Addison Wesley, 11a Edición México 2004.
- Lane Reese Ronald. Física Universitaria Vol. I. Thomson, México, 2000.

- García Díaz Rafael. Sistema Internacional de Unidades/factores y tablas de conversión. Limusa, 1a Edición, México 1984.
- Paul A. Tipler. Física para la ciencia y la tecnología. Edit. Reverté, Barcelona, 2001