Universidad Nacional de Ingeniería (UNI)
Escuela Profesional de
Ciencia de la Computación
Sílabo 2024-II

1. CURSO

FI101FCCS. Physics I (Mandatory)

2. INFORMACIÓN GENERAL

2.1 Curso	:	FI101FCCS. Physics I
2.2 Semestre	:	1^{st} Semester.
2.3 Créditos	:	3
2.4 horas	:	2 HT; 2 HP;
2.5 Duración del periodo	:	16 semanas
2.6 Condición	:	Mandatory
2.7 Modalidad de aprendizaje	:	Face to face
2.8 Prerrequisitos	:	None

3. PROFESORES

Atención previa coordinación con el profesor

4. INTRODUCCIÓN AL CURSO

Physics is essential for understanding the world around us, and its principles are fundamental in many areas of computer science, such as computer graphics, physical simulations, and robotics. This course introduces the basic concepts of classical mechanics, including kinematics, dynamics, work, and energy.

5. OBJETIVOS

- Understand the fundamental laws of classical mechanics.
- Apply these laws to solve problems of motion in one and two dimensions.
- Develop skills to analyze physical systems and model them mathematically.

6. RESULTADOS DEL ESTUDIANTE

1) Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions. (Assessment)

6) Apply computer science theory and software development fundamentals to produce computing-based solutions. (Assessment)

AG-C07) Computing Knowledge: Applies appropriate knowledge of mathematics, science, and computing. (Assessment)

AG-C09) Solution Design and Development: Designs, implements, and evaluates solutions for complex computing problems. (Assessment)

AG-C12) Applies computer science theory and software development fundamentals to produce computer-based solutions. (Assessment)

7. TEMAS

Unidad 1: Kinematics (8 horas)	
Resultados esperados: 1,AG-C07	
Temas	**Objetivos de Aprendizaje (*Learning Outcomes*)**
• Displacement, velocity, and acceleration. • Uniform and uniformly accelerated linear motion. • Projectile motion. • Uniform circular motion.	• Define and calculate displacement, velocity, and acceleration. [Familiarizarse] • Solve problems involving linear motion and projectile motion. [Usar] • Analyze uniform circular motion. [Evaluar]
Lecturas : [YF18], [SJ18]	

Unidad 2: Dynamics (10 horas)	
Resultados esperados: 1,AG-C07,AG-C09	
Temas	**Objetivos de Aprendizaje (*Learning Outcomes*)**
• Newton's laws of motion. • Forces of friction. • Work and energy. • Work-kinetic energy theorem. • Power.	• State and apply Newton's laws of motion. [Familiarizarse] • Calculate the work done by a force. [Usar] • Apply the work-kinetic energy theorem to solve dynamics problems. [Evaluar]
Lecturas : [YF18], [SJ18]	

Unidad 3: Conservation of Energy (8 horas)	
Resultados esperados: 1,AG-C07,AG-C09	
Temas	**Objetivos de Aprendizaje (*Learning Outcomes*)**
• Potential energy. • Conservation of mechanical energy. • Conservative and non-conservative forces.	• Define and calculate potential energy. [Familiarizarse] • Apply the principle of conservation of mechanical energy. [Usar] • Distinguish between conservative and non-conservative forces. [Evaluar]
Lecturas : [YF18], [SJ18]	

Unidad 4: Systems of Particles and Conservation of Linear Momentum (6 horas)	
Resultados esperados: 1,AG-C07,AG-C09	
Temas	**Objetivos de Aprendizaje (*Learning Outcomes*)**
• Center of mass. • Linear momentum. • Conservation of linear momentum. • Collisions.	• Calculate the center of mass of a system of particles. [Familiarizarse] • Apply the principle of conservation of linear momentum. [Usar] • Analyze elastic and inelastic collisions. [Evaluar]
Lecturas : [YF18], [SJ18]	

Unidad 5: Rotation (8 horas)	
Resultados esperados: 1,AG-C07,AG-C09	
Temas	**Objetivos de Aprendizaje (*Learning Outcomes*)**
• Rotational kinematics. • Rotational dynamics. • Moment of inertia. • Torque and rotational kinetic energy.	• Describe rotational motion using angular variables. [Familiarizarse] • Calculate the moment of inertia of simple objects. [Usar] • Apply the laws of rotational dynamics. [Evaluar]
Lecturas : [YF18], [SJ18]	

Unidad 6: Applications in Computing (8 horas)	
Resultados esperados: 1,AG-C07,AG-C12	
Temas	**Objetivos de Aprendizaje (*Learning Outcomes*)**
• Physical simulations. • Computer graphics. • Robotics.	• Explain how the principles of physics are used in physical simulations. [Familiarizarse] • Describe the application of physics in computer graphics. [Usar] • Analyze the use of physics in robotics. [Evaluar]
Lecturas : [YF18]	

8. PLAN DE TRABAJO

8.1 Metodología

Se fomenta la participación individual y en equipo para exponer sus ideas, motivándolos con puntos adicionales en las diferentes etapas de la evaluación del curso.

8.2 Sesiones Teóricas

Las sesiones de teoría se llevan a cabo en clases magistrales donde se realizarán actividades que propicien un aprendizaje activo, con dinámicas que permitan a los estudiantes interiorizar los conceptos.

8.3 Sesiones Prácticas

Las sesiones prácticas se llevan en clase donde se desarrollan una serie de ejercicios y/o conceptos prácticos mediante planteamiento de problemas, la resolución de problemas, ejercicios puntuales y/o en contextos aplicativos.

9. SISTEMA DE EVALUACIÓN

********* EVALUATION MISSING ********

10. BIBLIOGRAFÍA BÁSICA

[SJ18] Raymond A. Serway and John W. Jewett. *Physics for Scientists and Engineers with Modern Physics*. Cengage Learning, 2018.

[YF18] Hugh D. Young and Roger A. Freedman. *University Physics with Modern Physics*. Pearson, 2018.