



Universidad Nacional San Cristobal de Huamanga (UNSCH)

Programa Profesional de
Ciencia de la Computación
Sílabo 2024-II

1. CURSO

CS210. Algorithms and Data Structures (Mandatory)

2. INFORMACIÓN GENERAL

2.1 Curso	:	CS210. Algorithms and Data Structures
2.2 Semestre	:	4 th Semester.
2.3 Créditos	:	4
2.4 horas	:	2 HT; 4 HP;
2.5 Duración del periodo	:	16 semanas
2.6 Condición	:	Mandatory
2.7 Modalidad de aprendizaje	:	Face to face
2.8 Prerrequisitos	:	CS113. Computer Science II. (3 rd Sem) CS113. Computer Science II. (3 rd Sem)

3. PROFESORES

Atención previa coordinación con el profesor

4. INTRODUCCIÓN AL CURSO

The theoretical foundation of all branches of computing rests on algorithms and data structures, this course will provide participants with an introduction to these topics, thus forming a basis that will serve for the following courses in the career.

5. OBJETIVOS

- Make the student understand the importance of algorithms for solving problems.
- Introduce the student to the field of application of data structures.

6. RESULTADOS DEL ESTUDIANTE

- 1) Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions. (Usage)
- 2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. (Usage)
- 6) Apply computer science theory and software development fundamentals to produce computing-based solutions. (Usage)

7. TEMAS

Unidad 1: Graphs (12)	
Resultados esperados:	
Temas	Objetivos de Aprendizaje (<i>Learning Outcomes</i>)
• Graph Concept • Directed Graphs and Non-directed Graphs. • Using Graphs. • Measurement of efficiency ,in time and space. • Adjacency matrices. • Tag adjacent matrices. • Adjacency Lists. • Implementation of graphs using adjacency matrices. • Graph Implementation using adjacency lists • Insertion, search and deletion of nodes and edges. • Graph search algorithms.	• Acquire Dexterity to Perform Correct Implementation. [Usar] • Develop knowledge to decide when it is better to use one implementation technique than another. [Usar]
Lecturas : [Cor+09], [Fag+14], [Knu97], [Knu98]	

Unidad 2: Scatter Matrices (8)	
Resultados esperados:	
Temas	Objetivos de Aprendizaje (<i>Learning Outcomes</i>)
• Initial concepts. • Dense Matrices • Measurement of Efficiency in Time and Space • Static scatter vs. dynamic matrix creation. • Insert, search, and delete methods.	• Understand the use and implementation of scatter matrices.[Evaluar]
Lecturas : [Cor+09], [Fag+14], [Knu97], [Knu98]	

Unidad 3: Balanced Trees (16)	
Resultados esperados:	
Temas	Objetivos de Aprendizaje (<i>Learning Outcomes</i>)
• AVL Trees. • Measurement of Efficiency. • Simple and Composite Rotations • Insertion, deletion and search. • Trees B , B+ B* y Patricia.	• Understand the basic functions of these complex structures in order to acquire the capacity for their implementation. [Evaluar]
Lecturas : [Cor+09], [Fag+14], [Knu97], [Knu98]	

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

- [Knu97] Donald E. Knuth. *The Art of Computer Programming, Vol. 1: Fundamental Algorithms*. 3rd. Addison-Wesley Professional, 1997.
- [Knu98] Donald E. Knuth. *The art of computer programming, volume 3:Sorting and searching*. 2nd. Addison-Wesley Professional, 1998.
- [Cor+09] Thomas H. Cormen et al. *Introduction to Algorithms*. Third Edition. ISBN: 978-0-262-53305-8. MIT Press, 2009.
- [Fag+14] José Fager et al. *Estructura de datos*. First Edition. Iniciativa Latinoamericana de Libros de Texto Abiertos (LATIN), 2014.