Peruvian Computing Society (SPC)
School of Computer Science
Sillabus 2022-I

1. COURSE

CS3T3. Bioinformatic Algorithms (Elective)

2. GENERAL INFORMATION

2.1 Credits	:	4
2.2 Theory Hours	:	2 (Weekly)
2.3 Practice Hours	:	2 (Weekly)
2.4 Duration of the period	:	16 weeks
2.5 Type of course	:	Elective
2.6 Modality	:	Face to face
2.7 Prerrequisites	:	CS2T1. Computational Biology. (7^{th} Sem)

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

The use of computational methods in the biological sciences has become one of the key tools for the field of molecular biology, being a fundamental part of research in this area.

In Molecular Biology, there are several applications that involve both DNA, protein analysis or sequencing of the human genome, which depend on computational methods. Many of these problems are really complex and deal with large data sets.

This course can be used to see concrete use cases of several areas of knowledge of Computer Science such as Programming Languages (PL), Algorithms and Complexity (AL), Probabilities and Statistics, Information Management (IM), Intelligent Systems (IS).

5. GOALS

- That the student has a solid knowledge of molecular biological problems that challenge computing.
- That the student is able to abstract the essence of the various biological problems to pose solutions using their knowledge of Computer Science

6. COMPETENCES

a) An ability to apply knowledge of mathematics, science. (**Assessment**)

b) An ability to design and conduct experiments, as well as to analyze and interpret data. (**Assessment**)

7. SPECIFIC COMPETENCES

a10) Make a computational analysis that allows calculating the execution time of a given algorithm.

a11) Use mathematical techniques that allow to delimit sums and to solve recurrences that reflect the computational costs of an algorithm.

b4) Identify and efficiently apply various algorithmic strategies and data structures for the solution of a problem given certain space and time constraints.

b11) Understand the difference between an NP-difficult problem and one that has a polynomial solution.

b12) Given a problem with a polynomial solution, identify whether it can be solved by a voracious strategy, by a dynamic scheduling strategy or by a strategy of divide and conquer taking into account the size of the input.

8. TOPICS

Unit 1: Introduction to Molecular Biology (4)	
Competences Expected: CS1	
Topics	**Learning Outcomes**
• ... • ... • ...	• ... [Familiarity] • ... [Assessment]
Readings : [CB00], [SM97]	

9. WORKPLAN

9.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

9.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

9.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

10. EVALUATION SYSTEM

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

11. BASIC BIBLIOGRAPHY

[CB00] P. Clote and R. Backofen. *Computational Molecular Biology: An Introduction*. 279 pages. John Wiley & Sons Ltd., 2000.

[SM97] João Carlos Setubal and João Meidanis. *Introduction to computational molecular biology*. Boston: PWS Publishing Company, 1997, pp. I–XIII, 1–296. ISBN: 978-0-534-95262-4.