Bachelor in Computer Science

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MODULE HANDBOOK

Module name	**Bioinformatics**
Module level	Undergraduate
Code	MII-213404
Courses (if applicable)	N/A
Semester	Fall (Odd)
Contact person	Afiahayati, S.Kom., M.Cs., Ph.D.
Lecturer	1. Afiahayati, S.Kom., M.Cs., Ph.D. 2. Diyah Utami KP, M.Cs.
Language	Bahasa Indonesia & English
Relation to curriculum	1. Undergraduate degree program, optional, 4th / 6th semester. 2. International undergraduate program, optional, 4th / 6th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students.
Workload	1. Lectures: 3 x 50 = 150 minutes per week. 2. Exercises and Assignments: 2 x 50 = 100 minutes per week. 3. Private study: 1 x 50 = 50 minutes per week.
Credit points	3 credit points (sks).
Requirements according to the Examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Recommended prerequisites	Artificial Intelligence

Learning outcomes (course outcomes) and their corresponding PLOs	After completing this module, a student is expected to:

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CO1. Able to explain the biomolecular and data in bioinformatics

CO2. Able to describe basic tasks in bioinformatics

CO3. Be able to explain the algorithms for solving basic tasks in bioinformatics

CO4. Able to design a pipeline and implement basic tasks algorithms for solving a real case

CO5. Able to present and present the results pipeline and algorithms in solving the real case

PLO		CO1	CO2	CO3	CO4	CO5
Program Learning Outcome (PLO)	PLO1					
	PLO2	√	√			
	PLO3			√		
	PLO4				√	
	PLO5					√

Contents

1. Concept of biomolecular.
2. Data in bioinformatics, Next generation sequencing technology
3. Pairwise sequence alignment with indels.
4. Pairwise sequence alignment without indels.
5. Bio database searching
6. Multiple sequence alignment using CLUSTAL
7. Multiple sequence alignment using hidden markov model

Study and examination requirements and forms of examination

The evaluation is done in 2 forms, namely:

1. Trial, either midterm or semester test,
2. Two tasks, including individual,
3. Two group assignments to be completed within a certain timeframe, and

Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.

Media employed

e-learning Platform (ELOK), LCD, blackboard, and websites.

Assessments and Evaluation

Type	Percentage	CO1	CO2	CO3	CO4	CO5
Task 1	10	√				
Group Task 1	15		√			√
Midterm Test	25		√	√		
Task 2	10			√		
Group Task 2	20				√	√
Final Test	20				√	
Total	100					

Reading List	1. Jones, N.C., and Pevzner P.A., 2004, An Introduction to Bioinformatics Algorithms, MIT Press, Cambridge
	2. Durbin, R., Eddy, S.R., Krogh, A., Mitchison, G.,1998, Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids, Cambridge University Press, New York
	3. Colton, S., 2007, Introduction to Bioinformatics, Genetics Background, Course 341 Lecture Slide. Department of Computing Imperial College, London

Created date   :   May 27, 2021

Revision date   :   June 28, 2022