

Project-based integrative training and learning Bioinformatics for undergraduate students: A case study

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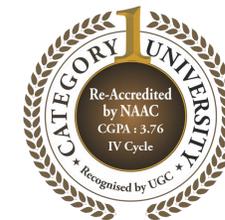


SASTRA

ENGINEERING · MANAGEMENT · LAW · SCIENCES · HUMANITIES · EDUCATION

DEEMED TO BE UNIVERSITY

(U/S 3 of the UGC Act, 1956)



THINK MERIT | THINK TRANSPARENCY | THINK SASTRA

T H A N J A V U R | K U M B A K O N A M | C H E N N A I

- Background
- Undergraduate Training in Bioinformatics at SASTRA
- Unconventional Mode of Assessment
 - Methodology
 - Assessment
 - Feedback

- School of Chemical and Biotechnology (1994) started a new Division of Bioinformatics in 2002.
- PG (M. Tech Bioinformatics) started with the support of GoI, DST-FIST
- One among the 12 centers to work on Open Source Drug Discovery.
- DBT supported Bioinformatics Centre and Network Centre from 2022.
- Programmes offered
 - B. Tech Bioinformatics
 - M. Tech Big Data Biology
 - M.Sc. Bioinformatics
 - Ph.D. Bioinformatics

Division of Bioinformatics

Vision

To evolve as a hub for excellence in bioinformatics education and research

Mission

- *To provide interdisciplinary education integrating information technology, biology, statistics, machine learning and data analytics*
- *To adopt pedagogical approaches oriented towards evolution of critical thinking and development of hands-on skills*
- *To create empowered bioinformaticians with competencies to analyse biological data, develop algorithms & models and validate the same*
- *To carry out cutting edge research in various fields of bioinformatics such as structural biology, biophysics, genomics, proteomics, epigenetics, systems biology, etc.*

- Conventional Mode of assessment
 - Continuous Internal Assessment (3)
 - End semester Exams – Pen and Paper
 - Laboratory Exams
- Unconventional Mode of assessment
 - Project-based assessment
 - Problem-based assessment
 - Term paper-based assessment
- Aim: To enable students to understand, comprehend, synthesize higher-level concepts (Revised Bloom's Taxonomy) and align with the competencies listed by ISCB.

- Systems Biology and Medicinal Chemistry are fourth-year elective courses for UG students.
- Small size of students
- Basics of concepts
- Design of the Project-based assessment
 - Topics to choose
 - Tools/Software
 - Hypothesis development
 - New skills – Technical and Professional

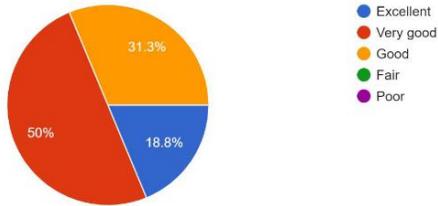
Methods used

- Estimating Capabilities on each side.
- One-on-One meetings
- Troubleshooting
- Presentation and Report

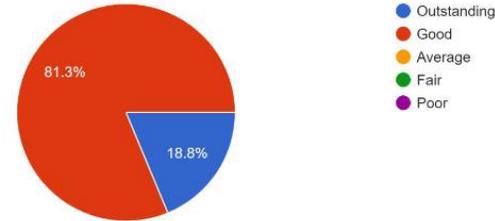
Feedback (Systems Biology)

Feedback requested date: 23rd March 2021
 Feedback compiled date: 25th March 2021

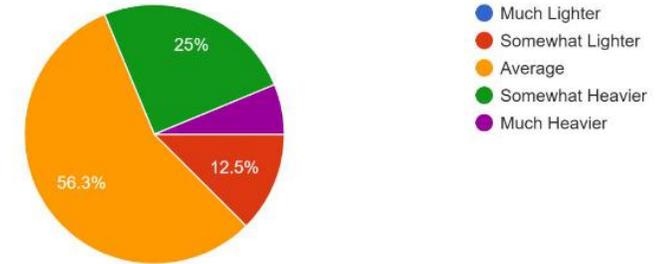
The Course Organization was
 16 responses



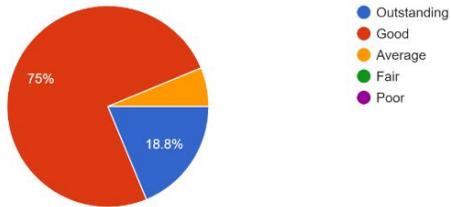
Overall, I would rate the quality of this course as
 16 responses



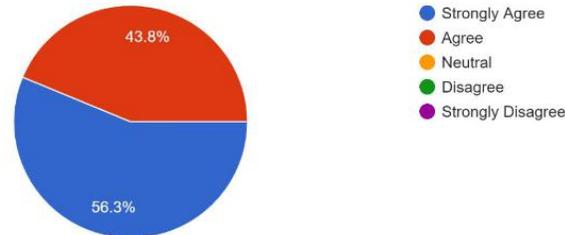
Workload: The workload for this course compared to others at SASTRA was:
 16 responses



Assignments: The contribution that the graded work (assessments, quiz, etc.) made to the learning experience was:
 16 responses



Challenge: I was challenged to extend my capabilities or to develop new ones.
 16 responses



The things I liked in this course were:

1. Reading a lot of research papers and discussing it
2. Convention of theory to project work
3. Learnt copasi software
4. It's really new course when compared to bioinformatics and more interesting to learn.
5. This course is challenging and requires great hardwork and skill set for the understanding.
6. The lecture is very good at teaching and explaining.
7. The chapters were in a link so that you could understand concepts easily and had enough time for project review.
8. Challenging!! :D
9. This course is quite a bit skill demanding compared to other courses
10. the topic was interesting.
11. Learned new techniques and research tool for analysis
12. I explored new topics which could be useful for me and I gained interest in the same.
13. I could able to learn about new softwares and how to handle it
14. I like the concept of mathematical modelling and learning it now
15. The course was very fascinating and interesting.
16. I like how systems biology is used in different aspects all over the world. This subject is very unique comparing to others.

The things I disliked in this course were:

1. Nil.
2. Nothing
3. None
4. During test we didn't have enough time to complete it. The time duration can be extended else the number of questions can be reduced.
5. Challenging! :)
6. So much of theory part

Feedback (Medicinal Chemistry)

The project was carried out in a manner that made it possible to correlate it to how the course was organized. To ensure that the problem statement I framed was original and accurate, I received the appropriate coaching and through a series of evaluations. Later, we received remote instruction from the course teacher on how to do a literature survey. A series of instructional sessions were held to ensure that users fully comprehend the concept of utilizing various software and web applications. Later, several assessments were carried out to ensure that the process was moving in the proper direction, and any errors were immediately fixed with various suggestions. My confidence in my ability to formulate a problem statement, troubleshoot errors, and make corrections has increased courtesy to project-based learning.

6. Is there anything which could be implemented differently?

I liked the overall pattern of the course and the way it went. I liked the detailed explanation for all the software and the guidance for the project provided.

7. Methodology of implementation for the project-based learning in your view

I liked the overall structure of the course. I liked the step-by-step instructions on handling the software, the written as well as video references, model papers and guidance really helped a lot. The case study based and literature based project methodology made the concepts relatable and to be used in the project.

Limitations

- No Team work
- Cannot be implemented in a class consisting of more than 20 students.
- Certain computationally intensive work may not be performed.

Thank You !