SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

Add on Course:Bioinformatics and Computational Biology

Session 2019-20

Course Coordinator Report

A free Add-On Course for UG students in the Department Microbiology, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur was held from 2nd January 2020 to 2nd March 2020. The course title was "Bioinformatics and Computational Biology". It is the complete beginner to Expert Course was perfect for anyone who wants to learn Bioinformatics and Computational Biology.

TheBioinformatics and Computational Biology course is designed to provide a comprehensive introduction to bioinformatics and computational biology, focusing on sequence alignment, molecular modeling, and data analysis using various software tools. It is designed to equip students with essential skills in data analysis, computational techniques, and molecular modeling.

The course duration was 10 weeks (30 hours). Two theory classes were engaged on Friday & Saturday and one Practical was engaged in every week. The structure of marking system was 50 marks on theory paper and 40 marks on practical examination including 10 marks for internal. The question paper of theory examination was in MCQ type of 25 questions with four multiple choices. Practical examination was also taken on this course for 40 marks. Internal marks assessment wason the basis of regularity, attendance, assignment submission. 48 out of 49 students were present in both theory and practical examination. The result was prepared and certificates were also distributed to the students.

Action Taken: Students gain a deep understanding of the fundamental principles of bioinformatics and computational biology, including algorithms, data structures, and statistical methods used to analyze biological data.Students learn to use various bioinformatics software and tools for tasks such as sequence alignment, phylogenetic analysis, and molecular modeling.

Science College, Congress Nagar, Nagpur
SEAL

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

Add on Course:Bioinformatics and Computational Biology

Session 2019-20

To,
The Principal
SSES Amt's Science College,
Congress Nagar, Nagpur-12

Subject: For permission to conduct the add on courses in the Department of Microbiology and Biotechnology – 2019-2020

Respected Sir,

This is to request you that, the teachers of our Microbiology and Biotechnology department have prepared the syllabus and modules of the 30 hours certificate courses for the session 2019-2020.

The details of the course module, syllabus and time table is submitted here with.

Hence please permit to run the add on courses and oblige me.

Thanking you

Yours sincerely

Date:- 21/06/2019

Mrs Minimadhugn...

HEAD
Department of Microbiology
Science College, Congress Nagar,
NAGPUR.

Permitted

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

NOTICE

Date: 23/12/2019

All the students are informed that **U.G.Department of MicrobiologyrunsAdd on Course:Bioinformatics and Computational Biology** for the session 2019-20. Interested students of B.Sc. are requested to register their names to the course Coordinator Ms. NupurDeshmukh on or before 31/12/2019.

SEAL

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

U.G. DEPARTMENT OF MICROBIOLOGY,
SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

AccreditedwithCGPAof3.51at'A+'GradebyNAAC,Bangalore
ACollegewithPotentialforExcellence
AnInstitutionalMemberofAPQN
RecognizedCenterforHigherLearning& Research
AMentorCollegeunderParamarshSchemeofUGC,NewDelhi
A Mentor College under Paris Sparsh Scheme of Maharashtra State

Add on Course for the Session 2019-20

on

Bioinformatics and Computational Biology

Course Introduction

This course provides a comprehensive introduction to bioinformatics and computational biology, focusing on sequence alignment, molecular modeling, and data analysis using various software tools. It is designed to equip students with essential skills in data analysis, computational techniques, and molecular modeling.

Course Objectives

- To understand the fundamental concepts of bioinformatics and computational biology.
- To develop proficiency in sequence alignment techniques.
- To learn the principles and applications of molecular modeling.
- To gain hands-on experience with bioinformatics software tools for data analysis.

Registration Date: 31/12/2019

Prof.AtulBobdey
Coordinator
Dept. of Microbiology

Prof.MahendraDhore
Principal
Science College, Nagpur

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

UG Department of Microbiology
Add on Course: Bioinformatics and Computational Biology

Session 2019-2020

Course Co-ordinator: Ms. NupurDeshmukh

Course Introduction

This course provides a comprehensive introduction to bioinformatics and computational biology, focusing on sequence alignment, molecular modeling, and data analysis using various software tools. It is designed to equip students with essential skills in data analysis, computational techniques, and molecular modeling.

Course Objectives

- To understand the fundamental concepts of bioinformatics and computational biology.
- To develop proficiency in sequence alignment techniques.
- To learn the principles and applications of molecular modeling.
- To gain hands-on experience with bioinformatics software tools for data analysis.

Instructional Strategies: Theory class, Practical, Video clips, Models etc.

Evaluation Strategies: Oral discussions and Final MCQ examination

Course Outcomes

Upon completion of this course, students will be able to:

- Apply bioinformatics tools for sequence analysis and alignment.
- Perform molecular modeling and understand its applications in biological research.
- Analyze biological data using computational methods.
- Utilize bioinformatics software for various biological data analysis tasks.
- **Duration of course:** Ten weeks (30 Hours)

Science College, Congress Nagar, Nagpur SEAL

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

UG Department of Microbiology
Add on Course: Bioinformatics and Computational Biology

Session 2019-2020

Module: The Structure of Syllabus and system of evaluation

Course	Theory Papers and Practical	Total Marks		
		Theory	Internal	Practical
Certificate Course in Bioinformatics and computational biology	Theory paper- bioinformatics and computational biology * Theory examination will be of MCQ pattern having 25 questions each with equal marks.	50	10	40
	* Practical examination will be based on performance evaluation in the laboratory and hands-on-training	100		

Ms. Nupur Deshmukh
Add on Course Coordinator

Dr. Amitabh Halder
IQAC Coordinator
Internal Quality Assurance Cell
(IQAC)
S. S. E. S. A. Science College
Congress Nagar, Nagpur.

Prof. Mahendra Dhore
Principal
Principal
S. S. E. S. Amravati's
Science College, Nagpur.

UG Department of Microbiology

Syllabus of Add on Course: Bioinformatics and Computational Biology

Course Units and Practical Sessions

Unit 1: Introduction to Bioinformatics

- **Topics:**
- Definition and scope of bioinformatics
- Biological databases (GenBank, EMBL, PDB)
- Basic bioinformatics tools and software
- **Practical 1:**
- Navigating biological databases
- Retrieving sequence data from NCBI

Unit 2: Sequence Alignment

- **Topics:**
- Types of sequence alignment (global, local)
- Algorithms for sequence alignment (Needleman-Wunsch, Smith-Waterman)
- Multiple sequence alignment (ClustalW, MUSCLE)
- **Practical 2:**
- Performing pairwise and multiple sequence alignments
- Interpreting alignment results

Unit 3: Molecular Modeling

- **Topics:**
- Basics of molecular modeling
- Homology modeling
- Molecular docking and dynamics
- **Practical 3:**
- Building a homology model using software (e.g., SWISS-MODEL)
- Molecular docking using AutoDock

Unit 4: Data Analysis and Visualization

- **Topics:**
- Bioinformatics data analysis techniques
- Statistical tools for data analysis
- Visualization of bioinformatics data
- **Practical 4:**
- Analyzing sequence data using R/Bioconductor
- Visualizing data using software (e.g., PyMOL, R)

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

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UG Department of Microbiology
Add on Course: Bioinformatics and Computational Biology
Week-wise teaching plan:(Session 2019-20)

Week	Hrs.	Syllabus
Week 1	2	Definition and scope of bioinformatics
	2	Biological databases (GenBank, EMBL, PDB)
Week 2	2	Basic bioinformatics tools and software
	2	Types of sequence alignment (global, local)
Week 3	2	Algorithms for sequence alignment (Needleman-Wunsch, Smith-Waterman)
	2	Multiple sequence alignment (ClustalW, MUSCLE)
Week 4	2	Basics of molecular modelingHomology modeling
	2	Homology modeling
Week 5	2	Molecular docking
	2	dynamics
Week 6	2	Bioinformatics data analysis techniques
Week 7	2	Statistical tools for data analysis
Week 8	2	Visualization of bioinformatics data
Week 9	1	Navigating biological databases Retrieving sequence data from NCBI
	1	Performing pairwise and multiple sequence alignments Interpreting alignment results
Week 10	1	Building a homology model using software (e.g., SWISS-MODEL) Molecular docking using AutoDock
	1	Analyzing sequence data using R/Bioconductor Visualizing data using software (e.g., PyMOL, R)

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

UG Department of Microbiology

Add on Course: Bioinformatics and Computational Biology

(Session 2019-20)

Time Table

w.e.f. 02/01/2020

Day	Theory
Friday	NupurDeshmukh(R. noB9) Theory 4.00 PM – 5.00 PM
Saturday	NupurDeshmukh (R. noB9) practical, 4.00 PM – 5.00 PM
	NupurDeshmukh (R. noB9) Theory, 4.00 PM – 5.00 PM

Science College, Congress Nagar, Nagpur. SEAL

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

ATTENDENCE SHEET (2019-20)

S.S.E.S.A`s Science College, Congress Nagar, Nagpur

Add on Course: Bioinformatics and Computational Biology (Session 2)

Class: Bioinformatics and Computational Biology **Month:** January + February

Theory/ Practical: **Name of Lecturer:** M.S. Nupur Deshmukh

Sr. No	Name of Student	3/1/20	4/1/20	10/1/20	11/1/20	17/1/20	18/1/20	24/1/20	25/1/20	31/1/20	1/2/20	7/2/20	8/2/20	14/2/20	15/2/20	22/2/20	28/2/20	29/2/20
1.	Aayushi umredkar	P	P	P	A	P	P	P	P	P	A	P	P	A	P	P	P	P
2.	Aditi khode	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P
3.	Aishwarya gour	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	P	P
4.	Aniket adase	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P
5.	Anjali lokhande	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P
6.	Ankit pajai	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	A
7.	Anuradha paralkar	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
8.	Anushree muley	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P
9.	Anushri mohod	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P
10.	Arati nimbalkar	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P	P
11.	Atharva rathod	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P
12.	Bhavana poddar	P	P	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P
13.	Bhavesh wadia	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	A
14.	Bhavish kumar	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
15.	Daksha ohri	P	P	P	P	P	A	P	P	A	P	P	P	A	P	P	P	P
16.	Dipti rangu	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P

17.	Harsh warkade	P	P	P	P	A	P	P	P	A	P	P	P	P	P	P	P	P	
18.	Harshali karpate	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	
19.	Harshul mishra	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	P	
20.	Isha arghode	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	
21.	Ishwari gawande	P	P	P	P	A	P	P	A	P	A	P	P	P	P	P	A	P	
22.	Janhvi dhote	P	P	P	P	P	P	P	P	P	A	P	A	P	P	P	A	P	
23.	Janhvi umate	A	P	P	P	A	P	P	A	P	P	A	P	P	P	P	P	P	
24.	Kalpana patra	P	P	P	A	P	P	P	P	A	P	P	P	P	P	P	A	P	
25.	Khushi kothale	A	P	P	P	A	P	P	P	P	P	P	P	A	P	P	P	P	
26.	Kinjal kulkarni	P	A	P	P	A	P	P	A	P	P	P	A	P	P	P	A	P	
27.	Komal waghmare	A	P	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	
28.	Mahek burchunde	P	A	P	P	A	P	P	P	P	A	P	P	P	P	A	P	A	
29.	Manisha wasake	A	P	P	P	P	A	P	P	P	P	A	P	P	P	P	A	P	
30.	Mansi gajbe	P	A	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P	
31.	Muskan choure	P	P	A	P	P	P	P	A	P	P	P	P	P	P	P	A	P	
32.	Muskan varma	A	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	
33.	Nazish jeevaji	P	P	P	A	P	P	P	A	P	P	A	P	P	P	P	A	P	
34.	Nishita shendre	A	A	P	P	P	P	A	P	P	A	P	P	P	A	A	P	P	
35.	Prachi kapse	P	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P	
36.	Prachi navghare	A	A	P	P	P	P	P	A	P	P	A	P	P	P	P	A	P	
37.	Pranjali singh	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	
38.	Pratik kumbhare	P	A	P	P	P	P	P	A	P	P	A	P	P	P	P	A	P	

39.	Pratiksha palandurkar	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P	P														
40.	Priya waghmare	A	P	P	P	P	A	P	P	P	A	P	P	P	P	P	A	P														
41.	Priyal dhoke	P	P	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P														
42.	Rahul tirpude	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	P	P														
43.	Rajashree hatwar	A	P	P	P	A	P	P	P	A	P	P	P	A	P	P	P	P														
44.	Rashmi agashe	P	P	P	A	P	P	P	A	P	P	P	A	P	P	P	P	A														
45.	Renuka mishra	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P	P														
46.	Renuka mohod	A	P	P	P	P	A	P	P	P	P	A	P	P	P	P	A	P														
47.	Ritika jadhav	P	A	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P														
48.	Rutugandha ukey	A	P	A	P	A	P	P	P	A	P	P	P	P	P	P	A	P														
49.	Sakshi bobde	P	P	A	P	P	A	P	A	P	P	A	P	P	P	P	P	P														

Nupur Deshmukh

ATTENDENCE SHEET (2019-20)

S.S.E.S.A`s Science College, Congress Nagar, Nagpur

Add on Course: Bioinformatics and Computational Biology (Session 2)

Class: Bioinformatics and Computational Biology **Month:** January + February

Theory/ Practical: **Name of Lecturer:** MS. Nupur Deshmukh

Sr. No	Name of Student	4/1/20	11/1/20	18/1/20	25/1/20	1/2/20	8/2/20	15/2/20	22/2/20	29/2/20
1.	Aayushi umredkar	P	P	P	P	P	A	P	P	A
2.	Aditi khode	A	P	P	P	P	P	P	P	P
3.	Aishwarya gour	P	P	P	P	P	P	A	P	P
4.	Aniket adase	P	P	P	P	P	P	P	A	P
5.	Anjali lokhande	P	P	P	P	A	P	P	P	P
6.	Ankit pajai	P	P	P	P	P	P	P	P	P
7.	Anuradha paralkar	P	P	P	A	P	P	P	P	P
8.	Anushree muley	P	P	P	P	P	P	P	P	P
9.	Anushri mohod	P	P	P	P	P	P	A	P	P
10.	Arati nimbalkar	P	A	P	P	P	P	P	A	P
11.	Atharva rathod	P	P	P	P	P	A	P	P	P
12.	Bhavana poddar	P	P	P	A	P	P	P	P	P
13.	Bhavesh wadia	P	P	P	P	A	P	P	P	P
14.	Bhavish kumar	P	P	P	P	P	A	P	P	P
15.	Daksha ohri	P	P	P	P	P	P	P	P	P
16.	Dipti rangu	P	P	P	P	A	P	P	P	P

17.	Harsh warkade	A	P	P	P	A	P	P	A	P
18.	Harshali karpate	P	P	P	P	P	P	P	P	P
19.	Harshul mishra	P	P	A	P	P	P	P	A	P
20.	Isha arghode	P	P	P	P	A	P	P	P	P
21.	Ishwari gawande	P	P	P	A	P	P	P	P	A
22.	Janhvi dhote	P	P	P	P	P	A	P	P	P
23.	Janhvi umate	P	P	P	P	A	P	P	P	P
24.	Kalpana patra	P	P	P	P	P	A	P	P	P
25.	Khushi kothale	P	P	P	P	P	P	A	P	P
26.	Kinjal kulkarni	P	P	P	P	P	A	P	P	P
27.	Komal waghmare	P	P	P	P	A	P	P	P	P
28.	Mahek burchunde	P	P	P	P	P	A	P	P	P
29.	Manisha wasake	P	P	P	P	P	P	A	P	P
30.	Mansi gajbe	P	P	P	P	A	P	P	P	A
31.	Muskan choure	P	P	P	P	P	A	P	P	P
32.	Muskan varma	P	P	P	A	P	P	P	A	P
33.	Nazish jeevaji	P	P	P	P	A	P	P	P	A
34.	Nishita shendre	P	P	P	P	P	A	P	P	P
35.	Prachi kapse	P	P	P	P	P	P	A	P	P
36.	Prachi navghare	P	P	P	P	A	P	P	P	P
37.	Pranjali singh	P	A	P	P	P	P	P	A	P
38.	Pratik kumbhare	P	P	P	P	P	P	A	P	P

39.	Pratiksha palandurkar	P	P	P	P	P	P	P	P	P																						
40.	Priya waghmare	P	A	P	P	P	A	P	P	P																						
41.	Priyal dhoke	P	P	P	P	A	P	P	P	P																						
42.	Rahul tirpude	P	P	P	P	P	P	A	P	P																						
43.	Rajashree hatwar	P	P	P	P	A	P	P	P	P																						
44.	Rashmi agashe	P	P	P	P	P	P	A	P	P																						
45.	Renuka mishra	P	P	P	P	P	P	P	P	P																						
46.	Renuka mohod	P	P	P	P	P	P	P	P	P																						
47.	Ritika jadhav	P	P	P	P	P	A	P	P	P																						
48.	Rutugandha ukey	P	P	P	P	P	P	P	P	P																						
49.	Sakshi bobde	P	P	P	P	P	P	P	P	P																						

Science College, Congress Nagar, Nagpur.
SEAL

Nupur Deshmukh

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

EXAMINATION NOTICE

Date:05/03/2020

All the students enrolled for **Add on Course:Bioinformatics and Computational Biology** for the session 2019-20 are informed that Theory and Practical Exam of the course is scheduled on 17/03/2020. All the appearing students are informed to remain present in Microbiology Laboratory at 10:30 – 11:30AM AM for Theory Exam and at 12:30PM – 5:30PM for Practical Exam.

Science College, Congress Nagar, Nagpur. SEAL

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

List of the Students: Add on Course- Bioinformatics and Computational Biology (Session 2019-2020)

Sr. No.	Name of Student	Signature
1)	AayushiUmredkar	Aayushi
2)	Aditi Khode	Akhode
3)	AishwaryaGour	Aishwarya
4)	AniketAdase	Aniket.
5)	Anjali Lokhande	Anjali
6)	Ankit Pajai	APajai
7)	AnuradhaParalkar	Anuradha
8)	AnushreeMuley	Anushree.
9)	AnushriMohod	Anushri
10)	AratiNimbalkar	Arati
11)	AtharvaRathod	Atharva.
12)	BhavanaPoddar	Bhavana
13)	BhaveshWadia	Bhavesh.
14)	Bhavish Kumar	Bhavish
15)	Daksha Ohri	Ohri
16)	DiptiRangu	Dipti
17)	Harsh Warkade	Warkade
18)	HarshaliKarpate	Harshali
19)	Harshul Mishra	Harshul.
20)	IshaArghode	IshaArghode
21)	IshwariGawande	Ishwari

22)	JanhviDhote	JanviD
23)	JanhviUmate	Janhvi
24)	KalpanaPatra	Kalpana
25)	KhushiKothale	Khushi
26)	Kinjal Kulkarni	Kinjal
27)	KomalWaghmare	Komal.
28)	MahekBurchunde	MahekB
29)	Manisha Wasake	Manisha
30)	Mansi Gajbe	MGajbe
31)	MuskanChoure	Muskan
32)	Muskan Varma	MVarma.
33)	NazishJeevaji	NazishJeevaji
34)	NishitaShendre	Nishita
35)	PrachiKapse	Prachi.
36)	PrachiNavghare	Prachi
37)	Pranjali Singh	Pranjali
38)	Pratik Kumbhare	Pratik
39)	PratikshaPalandurkar	Pratiksha
40)	PriyaWaghmare	Priya
41)	PriyalDhoke	Priyal
42)	Rahul Tirpude	RTirpude
43)	RajashreeHatwar	Rajshree
44)	RashmiAgashe	Agashe
45)	Renuka Mishra	RMishra

46)	RenukaMohod	RenukaMohod
47)	RitikaJadhav	Jadhav R
48)	RutugandhaUkey	
49)	SakshiBobde	SBobde

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

UG Department of Microbiology
Add on Course: Bioinformatics and Computational Biology
Week-wise teaching plan:(Session 2019-20)

Theory Exam Multiple Choice Questions (MCQs) Pattern

1. **What is the primary purpose of bioinformatics?**
- a) To study physical processes
- b) To analyze biological data
- c) To understand chemical reactions
- d) To diagnose diseases
- **Answer:** b) To analyze biological data

2. **Which database is commonly used for nucleotide sequences?**
- a) PDB
- b) GenBank
- c) PubMed
- d) Swiss-Prot
- **Answer:** b) GenBank

3. **What does the Needleman-Wunsch algorithm perform?**
- a) Local sequence alignment
- b) Global sequence alignment
- c) Protein structure prediction
- d) Molecular docking
- **Answer:** b) Global sequence alignment

4. **Which software is commonly used for multiple sequence alignment?**
- a) BLAST
- b) ClustalW
- c) AutoDock
- d) PyMOL
- **Answer:** b) ClustalW

5. **What is homology modeling?**
- a) Predicting gene expression
- b) Aligning DNA sequences
- c) Building a 3D model of a protein
- d) Analyzing metabolic pathways
- **Answer:** c) Building a 3D model of a protein

6. **Which tool is used for molecular docking?**
- a) MUSCLE
- b) AutoDock
- c) BLAST
- d) R
- **Answer:** b) AutoDock

7. **What is the role of BLAST in bioinformatics?**
- a) Data visualization
- b) Sequence alignment
- c) Molecular modeling

- d) Statistical analysis
- **Answer:** b) Sequence alignment

8. **Which of the following is a bioinformatics visualization tool?**
- a) ClustalW
- b) PyMOL
- c) BLAST
- d) Needleman-Wunsch
- **Answer:** b) PyMOL

9. **What type of data does the PDB database contain?**
- a) DNA sequences
- b) Protein structures
- c) Metabolic pathways
- d) Gene expression profiles
- **Answer:** b) Protein structures

10. **What is the Smith-Waterman algorithm used for?**
- a) Global sequence alignment
- b) Local sequence alignment
- c) Phylogenetic analysis
- d) Protein structure prediction
- **Answer:** b) Local sequence alignment

11. **Which software can be used for analyzing sequence data in R?**
- a) AutoDock
- b) BLAST
- c) Bioconductor
- d) PyMOL
- **Answer:** c) Bioconductor

12. **Which technique is used for predicting protein-ligand interactions?**
- a) Sequence alignment
- b) Homology modeling
- c) Molecular docking
- d) Data visualization
- **Answer:** c) Molecular docking

13. **What is a primary goal of molecular modeling?**
- a) To edit genes
- b) To predict molecular structures
- c) To visualize metabolic pathways
- d) To sequence DNA
- **Answer:** b) To predict molecular structures

14. **Which bioinformatics tool is used for comparing an input sequence to a database?**
- a) BLAST
- b) AutoDock
- c) PyMOL
- d) SWISS-MODEL
- **Answer:** a) BLAST

15. **What does the term 'bioinformatics' encompass?**
- a) Only sequence alignment
- b) Computational analysis of biological data
- c) Physical experiments on cells
- d) Chemical synthesis of biomolecules

- **Answer:** b) Computational analysis of biological data

16. **Which software is used for protein structure visualization?**
- a) BLAST
- b) ClustalW
- c) PyMOL
- d) MUSCLE
- **Answer:** c) PyMOL

17. **What is the main application of the SWISS-MODEL tool?**
- a) Sequence alignment
- b) Protein structure prediction
- c) Data analysis
- d) Molecular docking
- **Answer:** b) Protein structure prediction

18. **Which bioinformatics technique involves aligning three or more sequences?**
- a) Pairwise alignment
- b) Multiple sequence alignment
- c) Molecular docking
- d) Homology modeling
- **Answer:** b) Multiple sequence alignment

19. **What is the purpose of the EMBL database?**
- a) Storing protein structures
- b) Storing nucleotide sequences
- c) Analyzing metabolic pathways
- d) Visualizing gene expression
- **Answer:** b) Storing nucleotide sequences

20. **Which software can be used for creating 3D models of biomolecules?**
- a) ClustalW
- b) SWISS-MODEL
- c) Bioconductor
- d) MUSCLE
- **Answer:** b) SWISS-MODEL

21. **What does the term 'genome' refer to?**
- a) A single gene
- b) The complete set of genes or genetic material
- c) A single protein
- d) A metabolic pathway
- **Answer:** b) The complete set of genes or genetic material

22. **Which algorithm is used for local sequence alignment?**
- a) Needleman-Wunsch
- b) Smith-Waterman
- c) ClustalW
- d) MUSCLE
- **Answer:** b) Smith-Waterman

23. **Which bioinformatics tool is used for sequence similarity searching?**
- a) AutoDock
- b) PyMOL
- c) BLAST
- d) R

- **Answer:** c) BLAST

24. **Which type of software is MUSCLE?**
- a) Sequence alignment tool
- b) Molecular modeling tool
- c) Data visualization tool
- d) Statistical analysis tool
- **Answer:** a) Sequence alignment tool

25. **What is the main focus of bioinformatics?**
- a) Chemical synthesis
- b) Biological data analysis
- c) Physical processes
- d) Clinical diagnostics
- **Answer:** b) Biological data analysis

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

UG Department of Microbiology
Add-on Course:Bioinformatics and Computational Biology
(Session 2019-20)

Practical Exam Question Paper:

Subject :**Bioinformatics and Computational Biology**

Center : S.S.E.S.A's Science College, Nagpur

Time : 5 hrs per day

Dates : 17/03/2020

Max. Marks: 40

Q.1. Building a homology model using software (e.g. SWISS-MODEL)	10
Q.2. Analyzing sequence data using R/Bioconductor	10
Q.3. Viva-Voce	10
Q.4. Practical Record	10

Total Marks 40

Ms. NupurDeshmukh
Course- Coordinator
Add on Course

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Mentor College under 'PARAMARSH Scheme', UGC, New Delhi

U.G. DEPARTMENT OF MICROBIOLOGY

Add-on Course

Course Exam Name: Bioinformatics and Computational Biology

Name of Student: Aayushi Umredkar

Roll No.:

Session: 2019-20

Test Date: 17/03/20

Max. Marks: 50

Invigilator Signature

Obtained Marks: 50

INSTRUCTIONS FOR FILLING THE SHEET
1. This sheet should not be folded or crushed
2. Use only blue/ black ball point pen to fill the circles
3. Use of pencil is strictly prohibited.
4. Circles should be darkened completely and properly.
5. Cutting and erasing on this sheet is not allowed.
6. Do not use any stray marks on the sheet.
7. Do not use marker or white fluid to hide the mark.

WRONG METHODS ⊗ ◉ ⊘ ✓ CORRECT METHOD ○ ○ ○ ●

	A	B	C	D
1	○	●	○	○
2	○	●	○	○
3	○	●	○	○
4	○	●	○	○
5	○	○	●	○
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49	○	○	○	○
50	○	○	○	○

UG Department of Microbiology

Mark List: Add on Course- Bioinformatics and Computational Biology (Session 2019-2020)

Sr. No.	Name of Student	Marks obtained out of 50 (Theory)	Marks obtained out of 40 (Practical)	Marks obtained out of 10 (Internal)	Total Marks 100	Grade
1)	AayushiUmredkar	50	37	10	97	O
2)	Aditi Khode	48	36	10	94	O
3)	AishwaryaGour	42	35	10	87	A+
4)	AniketAdase	48	36	10	94	O
5)	Anjali Lokhande	44	35	10	89	A+
6)	Ankit Pajai	50	34	10	94	O
7)	AnuradhaParalkar	48	35	10	93	O
8)	AnushreeMuley	42	34	10	86	A+
9)	AnushriMohod	48	36	10	94	O
10)	AratiNimbalkar	50	38	10	98	O
11)	AtharvaRathod	46	39	10	95	O
12)	BhavanaPoddar	42	34	10	86	A+
13)	BhaveshWadia	44	35	10	89	A+
14)	Bhavish Kumar	46	39	10	95	O

15)	Daksha Ohri	48	36	10	94	0
16)	DiptiRangu	48	36	10	94	0
17)	Harsh Warkade	44	35	10	89	A+
18)	HarshaliKarpate	46	39	10	95	0
19)	Harshul Mishra	42	34	10	86	A+
20)	IshaArghode	48	36	10	94	0
21)	IshwariGawande	48	36	10	94	0
22)	JanhviDhote	50	38	10	98	0
23)	JanhviUmate	46	39	10	95	0
24)	KalpanaPatra	48	36	10	94	0
25)	KhushiKothale	42	34	10	86	A+
26)	Kinjal Kulkarni	46	39	10	95	0
27)	KomalWaghmare	50	38	10	98	0
28)	MahekBurchunde	48	36	10	94	0
29)	Manisha Wasake	50	38	10	98	0
30)	Mansi Gajbe	48	36	10	94	0
31)	MuskanChoure	44	35	10	89	A+
32)	Muskan Varma	42	34	10	86	A+

33)	NazishJeevaji	50	38	10	98	0
34)	NishitaShendre	46	39	10	95	0
35)	PrachiKapse	50	38	10	98	0
36)	PrachiNavghare	44	35	10	89	A+
37)	Pranjali Singh	42	34	10	86	A+
38)	Pratik Kumbhare	48	36	10	94	0
39)	PratikshaPalandurkar	48	36	10	94	0
40)	PriyaWaghmare	48	36	10	94	0
41)	PriyalDhoke	50	38	10	98	0
42)	Rahul Tirpude	44	35	10	89	A+
43)	RajashreeHatwar	46	39	10	95	0
44)	RashmiAgashe	50	38	10	98	0
45)	Renuka Mishra	AB	AB	AB	AB	AB
46)	RenukaMohod	50	38	10	98	0
47)	RitikaJadhav	48	36	10	94	0
48)	RutugandhaUkey	50	38	10	98	0
49)	SakshiBobde	48	36	10	94	0

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Ms. NupurDeshmukh
Course- Coordinator
Add on Course

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CERTIFICATE

Mr./Ku. Aayushi Umredkar is awarded with certificate on successful completion of the course entitled, Certificate course in "Bioinformatics & Computational Biology"

Session 2019-20 under Add-on course conducted for 30 hours from 02/01/2020 to 02/03/2020 by Department of Microbiology, SSESA's, Science College, congress Nagar, Nagpur 440012.

He/She has passed the Examination with 'O' Grade.

Dr. Pranita Gulhane
Coordinator, Department of Microbiology

Prof. M. P. Dhore
Principal, Science College.

UG Department of Microbiology
Session 2019-20
Add-On Courses: Bioinformatics and Computational Biology

Feedback form

Que.1 How would you rate the overall quality of the Add on Course- Bioinformatics and Computational Biology?

A. Excellent
B. Good
C. Average

Que.2 How well did the Add on Course- Bioinformatics and Computational Biology?

A. Exceeded expectation
B. Met expectations
C. Below expectations

Que. 3 How effective were the course instructor in delivering the Add on Course- Bioinformatics and Computational Biology?

A. Very effective
B. Effective
C. Ineffective

Que.4 How likely are you to recommend the Add on Course- Bioinformatics and Computational Biology?

A. Very likely
B. Likely
C. Unlikely

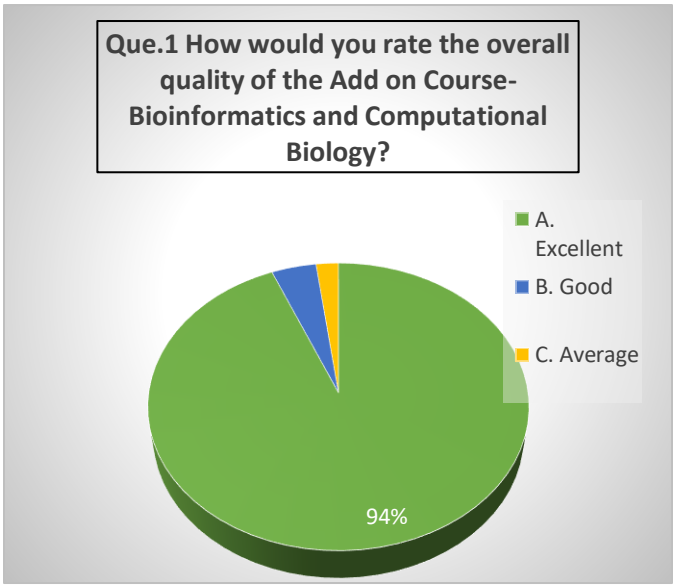
Que. 5 How satisfied are you with the practical sessions of the Add on Course- Bioinformatics and Computational Biology?

A. Very satisfied
B. Satisfied
C. Dissatisfied.

UG Department of Microbiology
Session 2019-20
Add-On Courses: Bioinformatics and Computational Biology
Feedback Responses

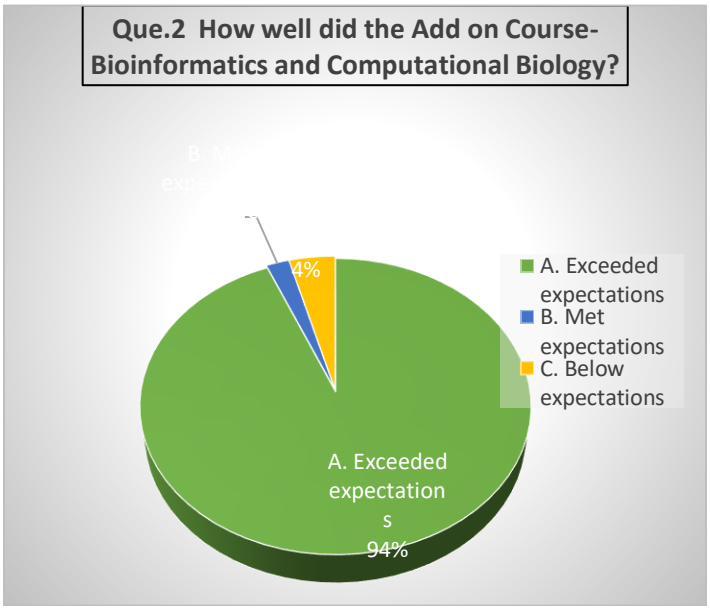
Que.1 How would you rate the overall quality of the Add on Course- Bioinformatics and Computational Biology?

Rating	No. of Students	Percentage
Excellent	45	94 %
Good	2	4 %
Average	1	2 %
Total	48	100%



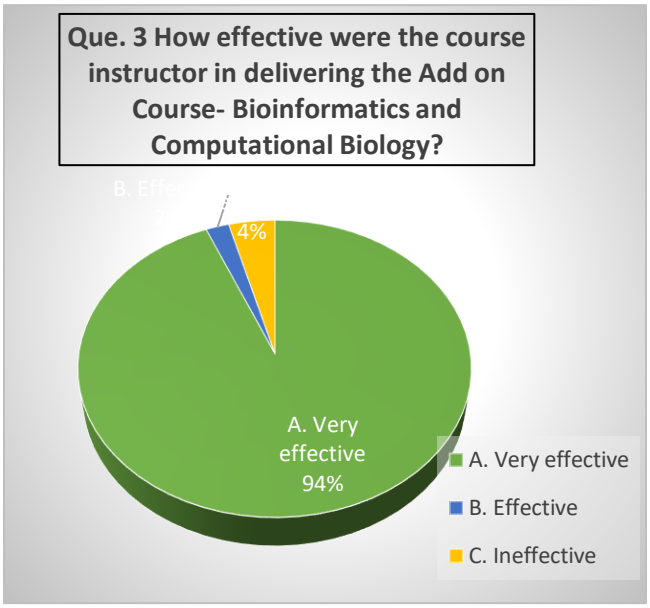
Que.2 How well did the Add on Course- Bioinformatics and Computational Biology?

Rating	No. of Students	Percentage
Exceeded expectations	45	94 %
Met Expectations	1	2 %
Below Expactations	2	4 %
Total	48	100%



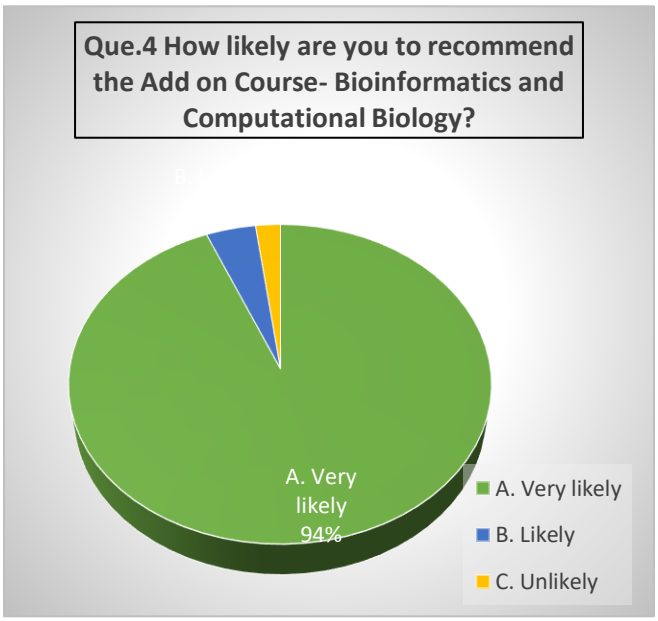
Que. 3 How effective were the course instructor in delivering the Add on Course- Bioinformatics and Computational Biology?

Rating	No. of Students	Percentage
Very effective	45	94 %
Effective	1	2 %
Ineffective	2	4 %
Total	48	100%



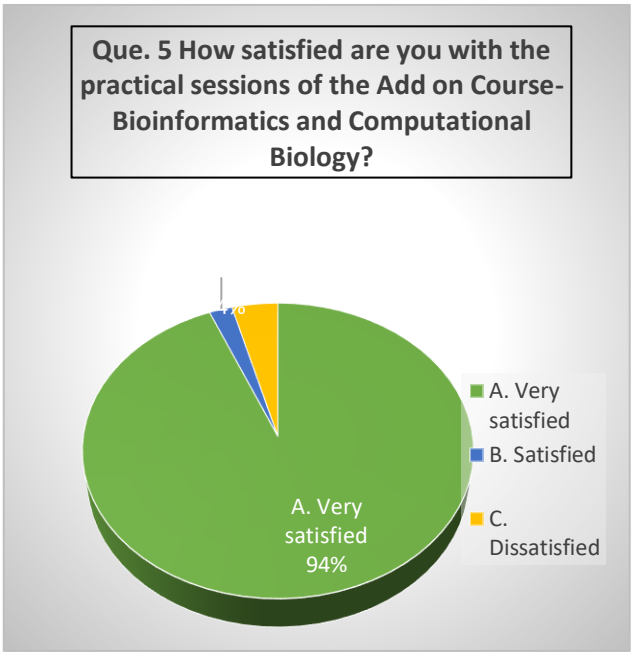
Que.4 How likely are you to recommend the Add on Course- Bioinformatics and Computational Biology?

Rating	No. of Students	Percentage
Very likely	45	94 %
Likely	2	4 %
Unlikely	1	2 %
Total	48	100%



Que. 5 How satisfied are you with the practical sessions of the Add on Course- Bioinformatics and Computational Biology?

Rating	No. of Students	Percentage
Very Satisfied	45	94 %
Satisfied	1	2 %
Dissatisfied	2	4 %
Total	48	100%



Mrs. Nupur Deshmukh

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Prof. Mahendra Dhore
Principal
Principal
S. S. E. S. Amravati's Science College, Nagpur.

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