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 August 2019 to 5th October 2019. 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.

The Bioinformatics 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 was on the basis of regularity, attendance, assignment submission etc. All the 81 students were present in both theory and practical examination. The result was prepared and certificates were also distributed to the students.

Science College, Congress Nagar, Nagpur. SEAL

Ms. Nupur Deshmukh
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

Mrs M J Madhugiri

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

Date:- 21/06/2019

SEAL
Science College, Congress Nagar, Nagpur.

Permitted
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SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

NOTICE

Date: 15/07/2019

All the students are informed that **U.G. Department of Microbiology** runs **Add 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. Nupur Deshmukh on or before 30/07/2019.

Science College, Congress Nagar, Nagpur. SEAL

Ms. Nupur Deshmukh
Course- Coordinator
Add on Course

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Ms. Nupur Deshmukh
Course- Coordinator
Add on Course

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

Accredited with CGPA of 3.51 at 'A+' Grade by NAAC, Bangalore
A College with Potential for Excellence
An Institutional Member of APQN
Recognized Center for Higher Learning & Research
A Mentor College under Paramarsh Scheme of UGC, New Delhi
A Mentor College under Paris Sparsh Scheme of Maharashtra State

Add on Course for the Session 2022-23
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: 30/07/2019

Prof. Atul Bobdey
Coordinator
Dept. of Microbiology

Prof. Mahendra Dhore
Principal
Science College, Nagpur

Ms. Nupur Deshmukh
Course- Coordinator
Add on Course

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

Session 2019-2020

Course Co-ordinator: Ms. Nupur Deshmukh

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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. Nupur Deshmukh
Course- Coordinator
Add on Course

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

Session 2019-2020

Course Co-ordinator: Ms. Nupur Deshmukh

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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.

Science College, Congress Nagar, Nagpur. SEAL

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)

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Ms. Nupur Deshmukh
Course- Coordinator
Add on Course

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)

Science College, Nagpur SEAL

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Course- Coordinator
Add on Course

UG Department of Microbiology

Add on Course: Bioinformatics and Computational Biology

(Session 2019-20)

Time Table

w.e.f. 02/08/2019

Day	Theory
Friday	Nupur Deshmukh (R. no B9) Theory 4.00 PM – 5.00 PM
Saturday	Nupur Deshmukh (R. no B9) practical, 4.00 PM – 5.00 PM
	Nupur Deshmukh (R. no B9) Theory, 4.00 PM – 5.00 PM

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SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Microbiology

EXAMINATION NOTICE

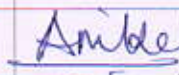
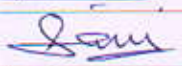
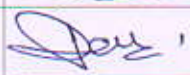
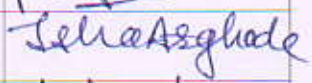
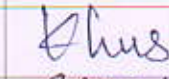
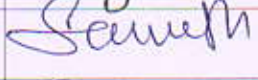
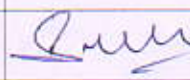
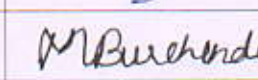
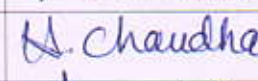
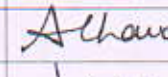
Date:07/10/2019

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 11/10/2019. 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. Nupur Deshmukh
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)	Adase Aniket	
2)	Admane Samiksha	
3)	Agashe Rashmi	
4)	Anantwar Pranjal	
5)	Arghode Isha	
6)	Armarkar Khushi	
7)	Bagde Sarvesh	
8)	Bobde Sakshi	
9)	Borkar Vrunda	
10)	Burchunde Mahek	
11)	Chaudhari Nidhi	
12)	Chauhan Anajali	
13)	Chavhan Aarya	
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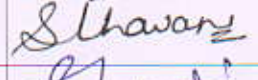
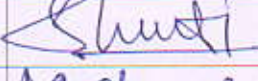
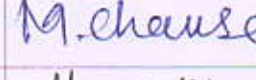
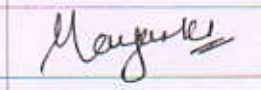
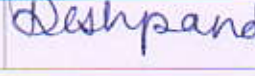
15)	Chavhan Sneha	
16)	Chopkar Shruti	
17)	Choure Muskan	
18)	Dave Mayank	
19)	Dehury Padmabati	
20)	Deshpande Shivani	

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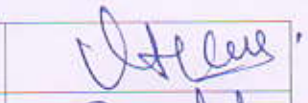
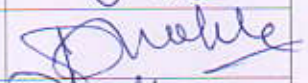
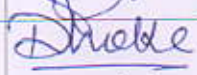
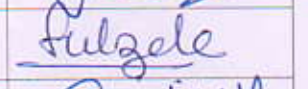
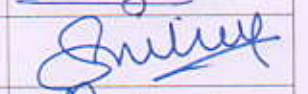
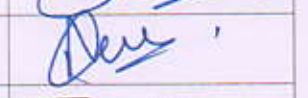
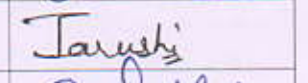
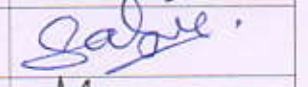
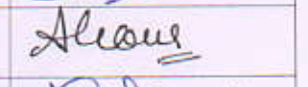
10)	Burchunde Mahek	
11)	Chaudhari Nidhi	
12)	Chauhan Anajali	
13)	Chavhan Aarya	
14)	Chavhan Sakshi	
15)	Chavhan Sneha	
16)	Chopkar Shruti	
17)	Choure Muskan	
18)	Dave Mayank	
19)	Dehury Padmabati	

21)	Dhakate Utkarsha	
22)	Dhoble Vaishnavi	
23)	Dhoke Priyal	
24)	Dhote Janhvi	
25)	Dube Vaishnavi	
26)	Fulzele Sakshi	
27)	Gaikwad Snehal	
28)	Gajbe Mansi	
29)	Gaure Tarushi	
30)	Gorlawar Sakshi	
31)	Gour Aishwarya	
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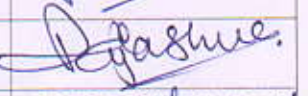
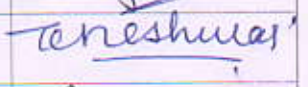
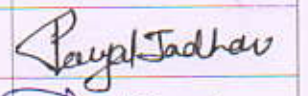
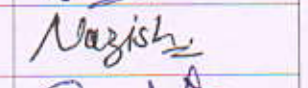
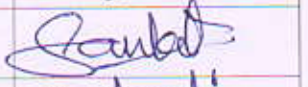
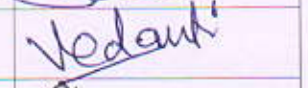
33)	Hatwar Rajashree	
34)	Hirapure Teneshwari	
35)	Jadhav Payal	
36)	Jadhav Ritika	
37)	Jaronde Vaibhav	
38)	Jeevaji Nazish	
39)	Jogi Sanket	
40)	Kali Vedanti	
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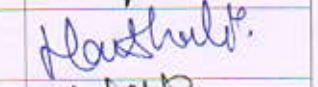
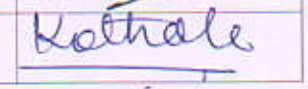
42)	Karpate Harshali	
43)	Khode Aditi	
44)	Kothale Khushi	

45)	Kshirsagar Sharvari	
46)	Kulkarni Kinjal	
47)	Kulkule Sakshi	
48)	Kumar Bhavish	
49)	Kumbhare Pratik	
50)	Lokhande Anjali	
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56)	Nishane Samiksha	
57)	Palandurkar Pratiksha	
58)	Pandey Supriya	
59)	Pangul Amisha	
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62)	Patil Sakshi	
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64)	Poddar Bhavana	
65)	Ramteke Shruti	
66)	Rangari Shruti	
67)	Rangu Dipti	
68)	Rathod Atharva	

21)	Dhakate Utkarsha	
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23)	Dhoke Priyal	
24)	Dhote Janhvi	
25)	Dube Vaishnavi	
26)	Fulzele Sakshi	
27)	Gaikwad Snehal	
28)	Gajbe Mansi	
29)	Gaure Tarushi	
30)	Gorlawar Sakshi	
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32)	Halmare Sharwari	
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34)	Hirapure Teneshwari	
35)	Jadhav Payal	
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40)	Kali Vedanti	
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43)	Khode Aditi	
44)	Kothale Khushi	

69)	Renge Shruti	S Renge.
70)	Roy Saptaparna	Saptaparna.
71)	Sahare Harshal	Harshal
72)	Sarda Sakshi	Sarda.
73)	Sawalkar Sejal	Sejal.
74)	Sawane Sharayu	S.Sawane
75)	Sharma Shubhangi	Shubhangi
76)	Sharma Swati	Swati
77)	Trivedi Shikha	STrivedi
78)	Wagh Asmita	Asmita.
79)	Waghmare Danshika	Waghmare
80)	Wasnik Rutik	W.Rutik.
81)	Yelekar Radha	Radhayelekar

Science College, Congress Nagar, Nagpur. SEAL

Nupur
Mrs. Nupur Deshmukh

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. Nupur Deshmukh
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 : 11/10/2019

Max. Marks: 40

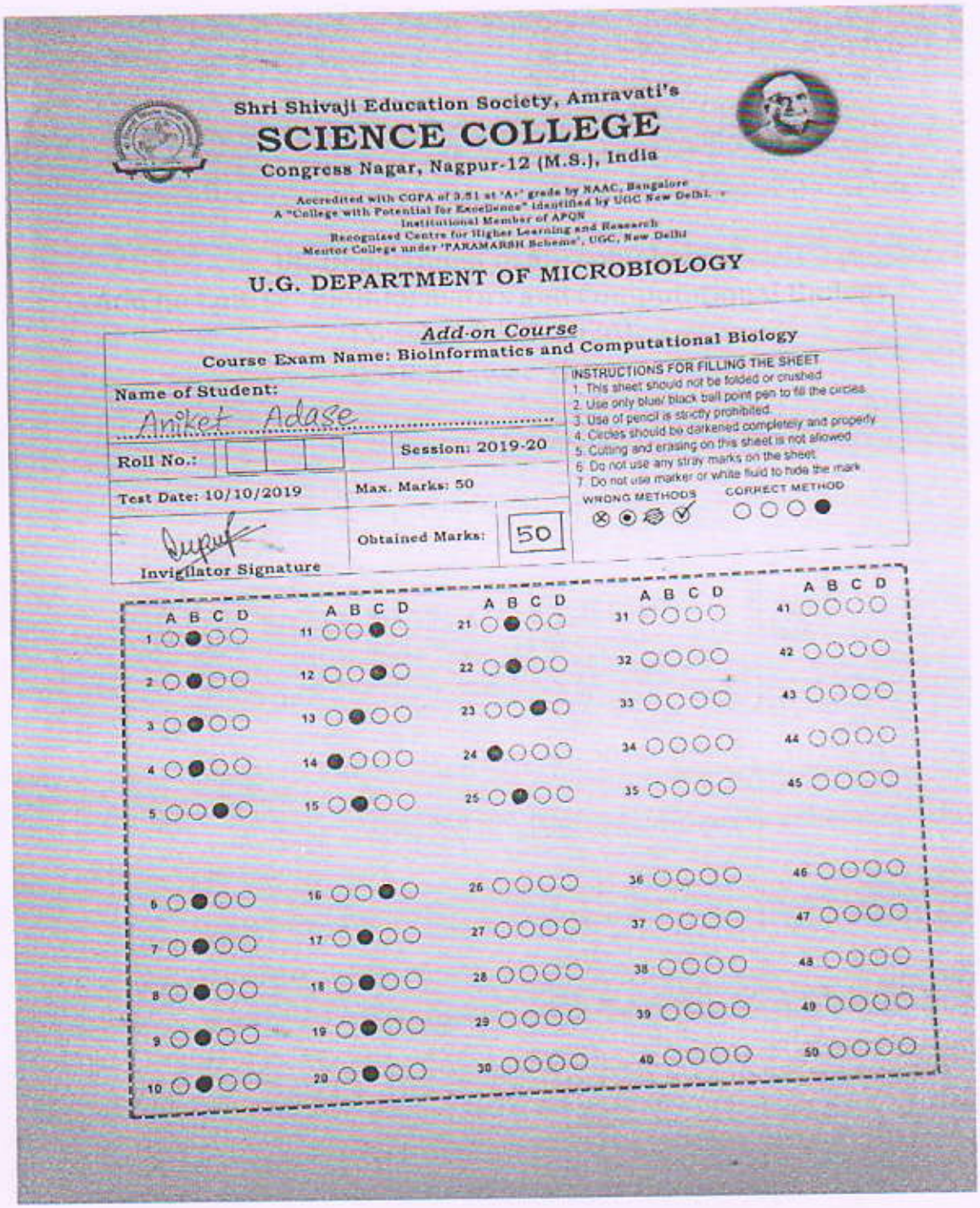
Q.1. Building a homology model using software (e.g. SWISS-MODEL)	10
Q.2. Analyzing sequence data using R/Bioconductor	10
Q.3. Viva-Voce	10
Q.4. Practical Record	10

Total Marks 40

Science College, Congress Nagar, Nagpur. SEAL

Ms. Nupur Deshmukh
Course- Coordinator
Add on Course

UG Department of Microbiology
Add on Course- Bioinformatics and Computational Biology
(Session 2019-2020)
OMR Answer Sheet



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U.G. DEPARTMENT OF MICROBIOLOGY

Add-on Course

Course Exam Name: Bioinformatics and Computational Biology

Name of Student: Aniket Adase

Roll No.:

Session: 2019-20

Test Date: 10/10/2019

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

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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)	Adase Aniket	50	37	10	97	O
2)	Admane Samiksha	48	36	10	94	O
3)	Agashe Rashmi	42	35	10	87	A+
4)	Anantwar Pranjal	48	36	10	94	O
5)	Arghode Isha	44	35	10	89	A+
6)	Armarkar Khushi	50	34	10	94	O
7)	Bagde Sarvesh	48	35	10	93	O
8)	Bobde Sakshi	42	34	10	86	A+
9)	Borkar Vrunda	48	36	10	94	O
10)	Burchunde Mahek	50	38	10	98	O
11)	Chaudhari Nidhi	46	39	10	95	O
12)	Chauhan Anajali	42	34	10	86	A+
13)	Chavhan Aarya	44	35	10	89	A+
14)	Chavhan Sakshi	46	39	10	95	O

15)	Chavhan Sneha	48	36	10	94	O
16)	Chopkar Shruti	48	36	10	94	O
17)	Choure Muskan	44	35	10	89	A+
18)	Dave Mayank	46	39	10	95	O
19)	Dehury Padmabati	42	34	10	86	A+
20)	Deshpande Shivani	48	36	10	94	O
21)	Dhakate Utkarsha	48	36	10	94	O
22)	Dhoble Vaishnavi	50	38	10	98	O
23)	Dhoke Priyal	46	39	10	95	O
24)	Dhote Janhvi	48	36	10	94	O
25)	Dube Vaishnavi	42	34	10	86	A+
26)	Fulzele Sakshi	46	39	10	95	O
27)	Gaikwad Snehal	50	38	10	98	O
28)	Gajbe Mansi	48	36	10	94	O
29)	Gaure Tarushi	50	38	10	98	O
30)	Gorlawar Sakshi	48	36	10	94	O
31)	Gour Aishwarya	44	35	10	89	A+
32)	Halmare Sharwari	42	34	10	86	A+

33)	Hatwar Rajashree	50	38	10	98	O
34)	Hirapure Teneshwari	46	39	10	95	O
35)	Jadhav Payal	50	38	10	98	O
36)	Jadhav Ritika	44	35	10	89	A+
37)	Jaronde Vaibhav	42	34	10	86	A+
38)	Jeevaji Nazish	48	36	10	94	O
39)	Jogi Sanket	48	36	10	94	O
40)	Kali Vedanti	48	36	10	94	O
41)	Kapse Prachi	50	38	10	98	O
42)	Karpate Harshali	44	35	10	89	A+
43)	Khode Aditi	46	39	10	95	O
44)	Kothale Khushi	50	38	10	98	O
45)	Kshirsagar Sharvari	42	34	10	86	A+
46)	Kulkarni Kinjal	50	38	10	98	O
47)	Kulkule Sakshi	48	36	10	94	O
48)	Kumar Bhavish	50	38	10	98	O
49)	Kumbhare Pratik	48	36	10	94	O
50)	Lokhande Anjali	50	38	10	98	O

51)	Mathpal Himanshi	50	38	10	98	O
52)	Meshram Ruruja	48	36	10	94	O
53)	Nannawre Vaishnavi	42	34	10	86	A+
54)	Nilatkar Sejal	50	38	10	98	O
55)	Ninawe Harsh	48	36	10	94	O
56)	Nishane Samiksha	50	38	10	98	O
57)	Palandurkar Pratiksha	48	36	10	94	O
58)	Pandey Supriya	48	36	10	94	O
59)	Pangul Amisha	50	38	10	98	O
60)	Paralkar Anuradha	46	39	10	95	O
61)	Pathak Samruddhi	50	38	10	98	O
62)	Patil Sakshi	50	38	10	98	O
63)	Patra Kalpana	42	34	10	86	A+
64)	Poddar Bhavana	44	35	10	89	A+
65)	Ramteke Shruti	50	38	10	98	O
66)	Rangari Shruti	48	36	10	94	O
67)	Rangu Dipti	50	38	10	98	O
68)	Rathod Atharva	42	35	10	87	A+

69)	Renge Shruti	44	35	10	89	A+
70)	Roy Saptaparna	48	36	10	94	O
71)	Sahare Harshal	42	34	10	86	A+
72)	Sarda Sakshi	46	39	10	95	O
73)	Sawalkar Sejal	50	38	10	98	O
74)	Sawane Sharayu	48	36	10	94	O
75)	Sharma Shubhangi	42	34	10	86	A+
76)	Sharma Swati	50	38	10	98	O
77)	Trivedi Shikha	44	35	10	89	A+
78)	Wagh Asmita	48	36	10	94	O
79)	Waghmare Danshika	48	36	10	94	O
80)	Wasnik Rutik	42	34	10	86	A+
81)	Yelekar Radha	46	39	10	95	O

Science College, Congress Nagar, Nagpur. SEAL

Ms. Nupur Deshmukh
Course- Coordinator
Add on Course

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CERTIFICATE

Mr./Ku. Adase Aniket 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 02/08/2019 to 05/10/2019 by Department of Microbiology, SSESA's, Science College, congress Nagar, Nagpur 440012.

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

Ms. Nupur Deshmukh
Coordinator, Department of Microbiology

SEAL

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