SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology
Add on Course: Metabolomics
Session 2023-24 Session 2

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 15th December 2023 to 24th February 2024. The course title was "Metabolomics". It is the complete beginner to Expert Course was perfect for anyone who wants to learn Metabolomics.

The Metabolomics course is designed to provide rapidly evolving field in biochemistry and molecular biology, focusing on the comprehensive analysis of small molecules (metabolites) within cells, tissues, and biofluids. This course provides an overview of metabolomics techniques, including metabolite extraction methods, mass spectrometry analysis, and data interpretation. It also explores the applications of metabolomics in understanding biological systems, health, and disease.

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 Out of 82, 80 were present in both theory and practical examination. The result was prepared and certificates were also distributed to the students.

Action Taken - In the Metabolomics Add-On course conducted by the Department of Biotechnology, students acquired advanced skills in metabolite extraction and analysis using state-of-the-art techniques. They learned to interpret complex metabolomics data and apply it to explore biological systems, health conditions, and disease mechanisms. The course also provided hands-on experience with practical applications and research methodologies, enhancing their expertise in the field.

Science College, Congress Nagar, Nagpur. SEAL

P Talekar

Ms. Payal Talekar
Course- Coordinator
Add on Course

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology

Add on Course: Metabolomics

Session 2023-24

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

Subject: For permission to conduct the add on courses in Microbiology and Biotechnology department during the session 2023-2024

Respected Sir,

This is to request you that, the teachers of Microbiology and Biotechnology department have prepared the syllabus and modules of the 30 hours certificate courses for the session 2023-2024.

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

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

Permitted

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology

NOTICE

Date: 04/12/2023

All the students are informed that **U.G.Department of Biotechnology** runs **Add on Course: Metabolomics** for the session 2023-24. Interested students of B.Sc. are requested to provide their names to the course Coordinator Ms. PayalTalekaron or before 12/12/2023.

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Ms. PayalTalekar
Course- Coordinator
Add-on Course

U.G. DEPARTMENT OF BIOTECHNOLOGY, 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 2023-24

on

Metabolomics

Add-on Certificate Course: Metabolomics

Course Co-ordinator: Ms. PayalTalekar

Course Introduction

Metabolomics is a rapidly evolving field in biochemistry and molecular biology, focusing on the comprehensive analysis of small molecules (metabolites) within cells, tissues, and biofluids. This course provides an overview of metabolomics techniques, including metabolite extraction methods, mass spectrometry analysis, and data interpretation. It also explores the applications of metabolomics in understanding biological systems, health, and disease.

Course Objectives

- Introduction to metabolomics techniques and instrumentation.
- Hands-on practice in metabolite extraction
- Data acquisition and processing
- Applications of metabolomics in health, disease

Registration Date: 12/12/2023

Prof. AtulBobdey	**Prof. MahendraDhore**	**Ms. PayalTalekar**
Coordinator	*Principal*	*Course- Coordinator*
Dept. of Biotechnology	*Science College, Nagpur*	*Add on Course*

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Course Co-ordinator: Ms. PayalTalekar

Course Introduction

Metabolomics is a rapidly evolving field in biochemistry and molecular biology, focusing on the comprehensive analysis of small molecules (metabolites) within cells, tissues, and biofluids. This course provides an overview of metabolomics techniques, including metabolite extraction methods, mass spectrometry analysis, and data interpretation. It also explores the applications of metabolomics in understanding biological systems, health, and disease.

Course Objectives

1. Introduction to metabolomics techniques and instrumentation.
2. Hands-on practice in metabolite extraction
3. Data acquisition and processing
4. Applications of metabolomics in health, disease

- **Instructional Strategies:** Theory class, Practical, Video clips, Models etc.
- **Evaluation Strategies**: Oral discussions and Final MCQ examination

Course Outcomes: By the end of this course, participants will be able to:

1. Understand the principles and importance of metabolomics in biological research.
2. Demonstrate proficiency in metabolite extraction techniques.
3. Perform mass spectrometry analysis for metabolite identification.
4. Interpret metabolomics data and draw meaningful conclusions.
5. Apply metabolomics concepts in addressing biological questions related to health and disease.

Duration of course: Ten weeks (30 Hours)

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Ms. Payal Talekar
Course- Coordinator
Add on Course

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Module: The Structure of Syllabus and system of evaluation

Course	Theory Papers and Practical	Total Marks		
		Theory	Internal	Practical
Certificate Course in Metabolomics	Theory paper- Metabolomics * 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. Payal Talekar
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.

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UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Syllabus of Add on Course: Metabolomics

Course Units

Unit 1: Introduction to Metabolomics

- Overview of metabolomics and its significance in biomedical research.
- Types of metabolites and their roles in cellular processes.
- Introduction to metabolomics techniques and instrumentation.

Unit 2: Metabolite Extraction Methods

- Principles of metabolite extraction from biological samples.
- Techniques for sample preparation and extraction optimization.
- Hands-on practice in metabolite extraction from different sample types.

Unit 3: Mass Spectrometry in Metabolomics

- Fundamentals of mass spectrometry for metabolite analysis.
- Ionization techniques and mass analyzers used in metabolomics.
- Data acquisition and processing in mass spectrometry-based metabolomics.

Unit 4: Data Interpretation and Applications

- Data analysis strategies in metabolomics.
- Statistical approaches for metabolomics data interpretation.
- Applications of metabolomics in health, disease, and biomarker discovery.

Practical Sessions:

Practical 1: Metabolite Extraction Techniques

- Hands-on practice in metabolite extraction from plant tissues.
- Optimization of extraction protocols for different metabolite classes.

Practical 2: Mass Spectrometry Analysis

- Introduction to mass spectrometry instruments and operation.
- Analysis of standard metabolite samples using mass spectrometry.

Practical 3: Data Processing and Analysis

- Data processing using metabolomics software tools.
- Statistical analysis and visualization of metabolomics data.

Practical 4: Application of Metabolomics

- Case studies on using metabolomics in disease diagnosis.
- Identification of potential biomarkers through metabolomics analysis.

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Ms. PayalTalekar
Course- Coordinator
Add on Course

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Week-wise teaching plan:

Week	Hrs.	Syllabus
Week 1	1	Overview of metabolomics
	1	significance of metabolomics in biomedical research.
	1	Types of metabolites and their roles in cellular processes.
Week 2	1	Introduction to metabolomics techniques
	1	Instrumentation in metabolomics
	1	Principles of metabolite extraction from biological samples.
Week 3	1	Techniques for sample preparation
	1	extraction optimization
	1	metabolite extraction from different sample types.
Week 4	1	Fundamentals of mass spectrometry for metabolite analysis
	1	Ionization techniques
	1	mass analyzers used in metabolomics.

Week 5	1	Data acquisition
	2	mass spectrometry-based metabolomics
Week 6	2	Data analysis.
	1	strategies in metabolomics
Week 7	2	metabolomics data interpretation.
	2	Statistical approaches
Week 8	2	Applications of metabolomics in health, disease
	2	biomarker discovery
Week 9	1	Metabolite Extraction Techniques
	1	Mass Spectrometry Analysis
Week 10	1	Data Processing and Analysis
	1	Application of Metabolomics

Ms. Payal Talekar
Course- Coordinator
Add on Course

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Add on Course: Metabolomics

Time Table

w.e.f. 15/12/2023

Day	Theory
Friday	Payal Talekar (R. no C6) Theory 4.00 PM – 5.00 PM
Saturday	Payal Talekar (R. no C6) practical, 4.00 PM – 5.00 PM
	Payal Talekar (R. no C6) Theory, 4.00 PM – 5.00 PM

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Ms. Payal Talekar
Course- Coordinator
Add on Course

ATTENDENCE SHEET (2023-24: SessionII)

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

Add on Course- Metabolomics

Class: Metabolomics

Month: Dec. + Jan + Feb

Theory/ Practical:

Name of Lecturer: Ms. Payal Taleka

Sr. No	Name of Student	15/12/23	16/12/23	22/12/23	23/12/23	29/12/23	30/12/23	05/01/24	06/01/24	12/01/24	13/01/24	19/01/24	20/01/24	27/01/24	02/02/24	03/02/24	09/02/24	10/02/24	16/02/24	17/02/24
1.	AMBULKAR ISHA PRADNYANAND	P	A	P	P	P	P	A	P	A	P	P	A	P	P	P	A	P	P	P
2.	ANMADWAR KHUSHI RAJENDRA	A	P	A	P	A	P	P	A	P	A	P	P	P	A	P	P	A	P	P
3.	BAHADURE VANSHITA DHARMAPAL	P	A	P	A	P	P	P	P	P	P	P	A	P	P	P	A	P	P	P
4.	BHAGWAT KETKI AVIRAJ	A	P	A	P	A	P	P	P	P	A	P	P	P	A	A	P	P	P	P
5.	BHALKAR GAURIABHIJIT	P	A	P	A	P	P	A	P	A	P	P	A	A	A	P	P	P		P
6.	BINEKARMANSISEVAK	P	P	P	P	A	P	P	P	A	P	P	P	P	P	A	P	P	P	P
7.	BISENRIYADELIRAM	P	A	P	A	P	A	A	P	P	A	P	P	P	A	P	P	P	P	P
8.	BORKARMANSVIRAVI	A	P	P	P	P	P	P	P	A	P	A	P	P	P	A	P	A	P	P
9.	BORKARNANDINIRAMKRUSHNA	P	A	A	P	P	A	A	P	P	A	P	P	P	A	P	P	P	P	P
10.	BORKARSHREYASHADINESH	P	A	P	A	A	P	P	P	P	P	P	P	A	P	A	P	A	P	P
11.	BUDDHALWARSIDDHIVYANKATESH	A	P	P	P	P	P	P	P	A	A	P	A	P	A	P	A	P	P	P
12.	BUDHEVINAYRAJENDRA	A	P	A	P	P	P	P	P	A	P	P	A	P	P	A	P	P	P	P
13.	CHAUHANSHANTANUSINGHSHAILENDRASINGH	P	P	A	P	P	P	P	A	P	A	A	P	A	P	P	P	P		P
14.	CHOUDHARISHRAVANIRAMESH	A	A	P	A	A	A	P	P	A	P	A	A	P	P	P	P	P	P	P
15.	DAHATSURBHIYOGRAJ	P	P	A	P	P	P	A	P	P	A	P	A	P	P	A	P	A	P	P
16.	DAHERIYAJAYSIKARAMKISHAN	P	P	P	A	P	A	P	A	P	P	P	P	P	P	P	P	P	A	P
17.	DAHIKARSARWANIATUL	A	P	A	P	A	P	A	P	P	A	P	P	A	P	P	D	D	P	D
18.	DASCHETANASHAKTIPRASAD	P	A	P	P	P	A	P	A	A	P	P	A	A	P	P	A	A	P	P
19.	DATARKARNAYANPRAKASHRAO	A	P	A	A	P	P	A	P	P	A	A	P	P	A	P	P	P	P	P
20.	DHOTESHRISHTIRAVINDRA	P	P	P	P	A	A	P	A	A	P	A	P	A	P	P	P	P	P	P
21.	DOYEPRANALISHRIKRUSHNA	A	P	A	P	P	P	A	P	P	A	P	A	A	P	P	P	P	P	P
22.	GARODEGARGISHAILESH	P	A	P	P	P	A	P	A	A	P	A	P	P	A	P	A	P	A	P
23.	GHOLSELEENABHOJRAJ	A	P	P	A	A	P	A	P	P	A	A	A	P	P	P	P	P	A	A
24.	GIRIYASHDILIP	P	P	A	P	P	A	P	A	A	P	P	P	A	P	P	A	D	A	P

25.	GODSESIDDHIMADHAV
26.	GOTMAREPARIKSHITDEEPAK
27.	GURVEADITIRAMKRUSHNA
28.	HADKETEJASVINITIN
29.	JAINSHRUTIRAVIKUMAR
30.	JENEKARSHREYANARENDRA
31.	KADUKARTIKVIVEK
32.	KALEVAIDEHIGIRISH
33.	KAMANESAURABHJAGDISH
34.	KAMBLESHATAKSHIVIJAY
35.	KHADSE ISHAESHWAR
36.	KHAPARDESOURABHIRAJENDRA
37.	KHEDULETASHUVIPUL
38.	KHOBRAGADEBHAVESH SUBHASH
39.	KOHAD PURVASANJAY
40.	KOLHEYASHASWIPRAVIN
41.	KUDKELWARJANHVIRAVI
42.	LANDESONALIRAJENDRA
43.	LOHAKARESHRAVNIKAWADU
44.	MADAVIMAITHILIPRABHAKAR
45.	MAHANTABHILASHACHANDRASHEKHAR
46.	MANWATKARMAHIPRAMOD
47.	MASRAMSAMRUDHISUBHASH
48.	MESHRAMSHRIVINNAVIN
49.	NAGBHIDKARASTHASANJAY
50.	NANDANWARSANIYAMURLIDHAR
51.	NIKOSEVAISHNAVIVASANTA
52.	NINAWERAKHISANJAY
53.	NIPANEDARSHIKADINDAYAL
54.	PARMARESHIKARAJU
55.	PATHEMANSIHANUMAN
56.	PATLENITALPRALHAD
57.	PATLEVAIBHAVSAHADEO
58.	PATLEVINARSNAYARAN
59.	PURKAMSANSKRUTIKISHOR
60.	RAHANGDALEKAJALTULSHIDAS

61.	RAMTEKERUTUJASHAILESH	
62.	RAUTKHUSHIBHALCHANDRA	
63.	RAUTNETRANARENDRA	
64.	SALUJA MANMEETKAUR RANJEETSINGH	
65.	SEPURWARRIYARAJENDRA	
66.	SHEIKHRAFIYAANJUMINTEYAJAHMAD	
67.	SHRIRAMESEJALSHANKAR	
68.	SHRIWASBHUMIKASUSHIL	
69.	TALEJAHANVISURESHKUMAR	
70.	TALHARSHRUTIAVINASH	
71.	TELANGVAIDEHIVIVEK	
72.	TITARMARERENUKAAJAY	
73.	UIKEYSEJWALSANJAY	
74.	UMREDKARBHAVINEEANIL	
75.	WADASKARNANDINIARVIND	
76.	WAGDENANDINIHEMANT	
77.	WAGHANUSHKAVIKRAM	
78.	WAGHAMARE MRUNALIMORESHWAR	
79.	WANKHEDEDURVESHNILESH	
80.	WANKHEDEKANCHANVINOD	
81.	WASNIKASTHASUNIL	
82.	YADAVJIYAASHOK	

SEAL

Ms. Payal Talekar.

ATTENDENCE SHEET (2023-24: Session I)

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

Add on Course- Metabolomics

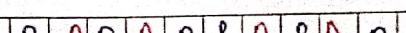
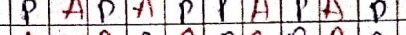
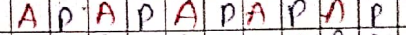
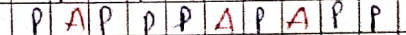
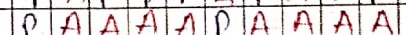
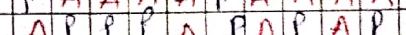
Class: Metabolomics

Theory/ Practical: ✓

Month: Dec. + Jan. + Feb

Name of Lecturer: Ms. Payal Talekar

Sr. No	Name of Student	16/12/23	23/12/23	30/12/23	06/01/24	13/01/24	20/01/24	27/01/24	03/02/24	10/02/24	17/02/24
1.	AMBULKAR ISHA PRADNYANAND	P	A	P	A	P	A	P	P	A	A
2.	ANMADWAR KHUSHI RAJENDRA	A	P	A	P	A	P	A	A	P	P
3.	BAHADURE VANSHITA DHARMAPAL	P	A	P	A	P	A	P	P	A	A
4.	BHAGWAT KETKI AVIRAJ	A	A	A	A	P	A	P	A	P	P
5.	BHALKAR GAURIABHIJIT	P	P	P	P	P	A	P	P	A	A
6.	BINEKARMANSISEVAK	A	A	P	A	A	P	A	A	P	P
7.	BISENRIYADELIRAM	P	P	A	P	P	A	P	A	A	A
8.	BORKARMANSVIRAVI	A	P	P	A	A	P	A	A	A	A
9.	BORKARNANDINIRAMKRUSHNA	P	A	A	P	A	A	A	P	P	P
10.	BORKARSHREYASHADINESH	A	P	P	A	A	P	P	A	A	A
11.	BUDDHALWARSIDDHIVYANKATESH	P	A	A	P	A	A	A	A	A	P
12.	BUDHEVINAYRAJENDRA	P	P	P	A	P	A	P	P	P	A
13.	CHAUHANSHANTANUSINGHSHAILENDRASINGH	A	A	P	P	A	P	A	A	A	P
14.	CHOUDHARISHRAVANIRAMESH	P	P	P	P	A	A	A	A	P	A
15.	DAHATSURBHIYOGRAJ	P	A	P	A	P	A	P	A	A	P
16.	DAHERIYAJAYSIKARAMKISHAN	A	P	A	P	A	A	A	A	A	A
17.	DAHIKARSARWANIATUL	P	A	P	A	P	A	A	P	A	P
18.	DASCHETANASHAKTIPRASAD	A	P	P	P	A	P	A	A	A	A
19.	DATARKARNAYANPRAKASHRAO	P	A	A	A	A	A	P	P	A	A
20.	DHOTESHRISHTIRAVINDRA	A	P	P	P	A	P	A	A	A	P
21.	DOYEPRANALISHRIKRUSHNA	P	A	A	A	P	A	P	A	P	A
22.	GARODEGARGISHAILESH	A	P	P	P	P	A	P	A	A	P
23.	GHOLSELEENABHOJRAJ	P	A	A	P		P	P	A	A	P
24.	GIRIYASHDILIP	A	P	A	P	A	P	P	A	P	A

25.	GODSESIDDHIMADHAV	
26.	GOTMAREPARIKSHITDEEPAK	
27.	GURVEADITIRAMKRUSHNA	
28.	HADKETEJASVINITIN	
29.	JAINSHRUTIRAVIKUMAR	
30.	JENEKARSHREYANARENDRA	
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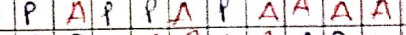
33.	KAMANESAURABHJAGDISH	
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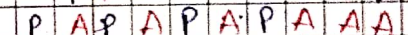
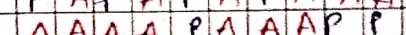
35.	KHADSE ISHAESHWAR	
36.	KHAPARDESOURABHIRAJENDRA	
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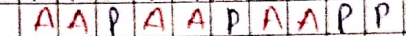
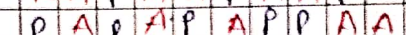
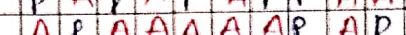
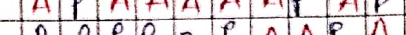
40.	KOLHEYASHASWIPRAVIN	
41.	KUDKELWARJANHVIRAVI	
42.	LANDESONALIRAJENDRA	
43.	LOHAKARESHRAVNIKAWADU	
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45.	MAHANTABHILASHACHANDRASHEKHAR	
46.	MANWATKARMAHIPRAMOD	
47.	MASRAMSAMRUDHISUBHASH	
48.	MESHRAMSHRIVINNAVIN	
49.	NAGBHIDKARASTHASANJAY	
50.	NANDANWARSANIYAMURLIDHAR	
51.	NIKOSEVAISHNAVIVASANTA	
52.	NINAWERAKHISANJAY	
53.	NIPANEDARSHIKADINDAYAL	
54.	PARMARESHIKARAJU	
55.	PATHEMANSIHANUMAN	
56.	PATLENITALPRALHAD	
57.	PATLEVAIBHAVSAHADEO	
58.	PATLEVINARSNAYARAN	
59.	PURKAMSANSKRUTIKISHOR	
60.	RAHANGDALEKAJALTULSHIDAS	

61.	RAMTEKERUTUJASHAILESH	P	A	P	A	P	A	A	A	P	P																					
62.	RAUTKHUSHIBHALCHANDRA	A	A	A	P	A	A	P	A	P	P																					
63.	RAUTNETRANARENDRA	A	P	P	A	A	P	A	A	P	A																					
64.	SALUJA MANMEETKAUR RANJEETSINGH	P	A	A	P	A	A	P	P	A	P																					
65.	SEPURWARRIYARAJENDRA	A	A	P	A	P	A	A	A	A	A																					
66.	SHEIKHRAFIYAANJUMINTEYAJAHMAD	A	A	A	P	A	P	A	P	A	P																					
67.	SHRIRAMESEJALSHANKAR	P	A	A	A	A	A	A	A	A	P																					
68.	SHRIWASBHUMIKASUSHIL	A	P	A	P	A	P	P	A	A	A																					
69.	TALEJAHANVISURESHKUMAR	A	A	P	A	P	A	A	P	A	A																					
70.	TALHARSHRUTIAVINASH	A	A	A	P	A	A	P	A	A	P																					
71.	TELANGVAIDEHIVIVEK	P	A	P	A	P	P	A	P	A	A																					
72.	TITARMARERENUKAAJAY	P	A	P	P	A	P	A	P	A	P																					
73.	UIKEYSEJWALSANJAY	A	A	P	A	A	A	A	A	P	A																					
74.	UMREDKARBHAVINEEANIL	P	P	A	P	A	P	A	A	A	P																					
75.	WADASKARNANDINIARVIND	A	A	P	A	P	A	A	P	P	P																					
76.	WAGDENANDINIHEMANT	P	A	P	A	P	P	A	P	A	P																					
77.	WAGHANUSHKAVIKRAM	A	A	A	A	A	A	A	A	P	A																					
78.	WAGHAMARE MRUNALIMORESHWAR	A	P	A	P	A	P	A	P	A	P																					
79.	WANKHEDEDURVESHNILESH	P	A	P	A	P	A	A	A	P	A																					
80.	WANKHEDEKANCHANVINOD	A	A	A	P	A	P	P	P	A	P																					
81.	WASNIKASTHASUNIL	A	P	A	A	A	A	A	A	A	A																					
82.	YADAVJIYAASHOK	A	A	P	A	P	A	P	A	A	A																					

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Ptalekar.
Ms. Payal Talekar.

SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S

SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR

UG Department of Biotechnology

EXAMINATION NOTICE

Date: 28/02/2024

All the students enrolled for**Add on Course: Metabolomics** for the session 2023-24 are informed that Theory and Practical Exam of the course is scheduled on 06/03/2024. All the appearing students are informed to remain present in Biotechnology 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. Payal Talekar
Course- Coordinator
Add on Course

List of the Students: Add on Course- Metabolomics

(Session 2023-2024)

Sr. No.	Name of Student	Signature
1)	AMBULKAR ISHA PRADNYANAND	
2)	ANMADWAR KHUSHI RAJENDRA	
3)	BAHADURE VANSHITA DHARMAPAL	
4)	BHAGWAT KETKI AVIRAJ	
5)	BHALKAR GAURI ABHIJIT	ABSENT
6)	BINEKAR MANSI SEVAK	
7)	BISEN RIYA DELIRAM	
8)	BORKAR MANSVI RAVI	
9)	BORKAR NANDINI RAMKRUSHNA	
10)	BORKAR SHREYASHA DINESH	
11)	BUDDHALWAR SIDDHI VYANKATESH	
12)	BUDHE VINAY RAJENDRA	
13)	CHAUHAN SHANTANUSINGH SHAILENDRASINGH	
14)	CHOUDHARI SHRAVANI RAMESH	
15)	DAHAT SURBHI YOGRAJ	
16)	DAHERIYA JAYSIKA RAMKISHAN	
17)	DAHIKAR SARWANI ATUL	
18)	DAS CHETANA SHAKTIPRASAD	
19)	DATARKAR NAYAN PRAKASHRAO	
20)	DHOTE SHRISHTI RAVINDRA	
21)	DOYE PRANALI SHRIKRUSHNA	
22)	GARODE GARGI SHAILESH	
23)	GHOLSE LEENA BHOJRAJ	ABSENT
24)	GIRI YASH DILIP	

25)	GODSE SIDDHI MADHAV	
26)	GOTMARE PARIKSHIT DEEPAK	
27)	GURVE ADITI RAMKRUSHNA	
28)	HADKE TEJASVI NITIN	
29)	JAIN SHRUTI RAVIKUMAR	
30)	JENEKAR SHREYA NARENDRA	
31)	KADU KARTIK VIVEK	
32)	KALE VAIDEHI GIRISH	
33)	KAMANE SAURABH JAGDISH	
34)	KAMBLE SHATAKSHI VIJAY	
35)	KHADSE ISHA ESHWAR	
36)	KHAPARDE SOURABHI RAJENDRA	
37)	KHEDULE TASHU VIPUL	
38)	KHOBRAGADE BHAVESH SUBHASH	
39)	KOHAD PURVA SANJAY	
40)	KOLHE YASHASWI PRAVIN	
41)	KUDKELWAR JANHVI RAVI	
42)	LANDE SONALI RAJENDRA	
43)	LOHAKARE SHRAVNI KAWADU	
44)	MADAVI MAITHILI PRABHAKAR	
45)	MAHANT ABHILASHA CHANDRASHEKHAR	
46)	MANWATKAR MAHI PRAMOD	
47)	MASRAM SAMRUDHI SUBHASH	
48)	MESHRAM SHRIVIN NAVIN	
49)	NAGBHIDKAR ASTHA SANJAY	
50)	NANDANWAR SANIYA MURLIDHAR	
51)	NIKOSE VAISHNAVI VASANTA	
52)	NINAWE RAKHI SANJAY	
53)	NIPANE DARSHIKA DINDAYAL	
54)	PARMAR ESHIKA RAJU	
55)	PATHE MANSI HANUMAN	

56)	PATLE NITAL PRALHAD	
57)	PATLE VAIBHAV SAHADEO	
58)	PATLE VINARS NAYARAN	
59)	PURKAM SANSKRUTI KISHOR	
60)	RAHANGDALE KAJAL TULSHIDAS	
61)	RAMTEKE RUTUJA SHAILESH	
62)	RAUT KHUSHI BHALCHANDRA	
63)	RAUT NETRA NARENDRA	
64)	SALUJA MANMEET KAUR RANJEET SINGH	
65)	SEPURWAR RIYA RAJENDRA	
66)	SHEIKH RAFIYA ANJUM INTEYAJ AHMAD	
67)	SHRIRAME SEJAL SHANKAR	
68)	SHRIWAS BHUMIKA SUSHIL	
69)	TALE JAHANVI SURESH KUMAR	
70)	TALHAR SHRUTI AVINASH	
71)	TELANG VAIDEHI VIVEK	
72)	TITARMARE RENUKA AJAY	
73)	UIKEY SEJWAL SANJAY	
74)	UMREDKAR BHAVINEE ANIL	
75)	WADASKAR NANDINI ARVIND	
76)	WAGDE NANDINI HEMANT	
77)	WAGH ANUSHKA VIKRAM	
78)	WAGHAMARE MRUNALI MORESHWAR	
79)	WANKHEDE DURVESH NILESH	
80)	WANKHEDE KANCHAN VINOD	
81)	WASNIK ASTHA SUNIL	
82)	YADAV JIYA ASHOK	

Science College, Congress Nagar, Nagpur.
SEAL

Ms. Payal Talekar

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Theory Exam Multiple Choice Questions (MCQs) Pattern

1. What is metabolomics?
- A) Study of large biomolecules
- B) Study of small molecules in biological systems
- C) Study of cell structure
- D) Study of protein interactions
- **Answer: B**

2. Which technique is commonly used for metabolite extraction?
- A) Polymerase chain reaction (PCR)
- B) Spectrophotometry
- C) Liquid-liquid extraction
- D) Western blotting
- **Answer: C**

3. What is the purpose of mass spectrometry in metabolomics?
- A) To analyze DNA sequences
- B) To identify proteins
- C) To detect and quantify metabolites
- D) To study cell morphology
- **Answer: C**

4. Which of the following is NOT a mass spectrometry ionization technique?
- A) Electrospray ionization (ESI)
- B) Matrix-assisted laser desorption/ionization (MALDI)
- C) Polymerase chain reaction (PCR)
- D) Chemical ionization (CI)
- **Answer: C**

5. What is a common statistical method used in metabolomics data analysis?
- A) Polymerase chain reaction (PCR)
- B) Principal component analysis (PCA)
- C) Western blotting
- D) Spectrophotometry
- **Answer: B**

6. Which of the following is an application of metabolomics?
- A) Disease diagnosis
- B) Structural biology
- C) Cell culture techniques
- D) Immunohistochemistry
- **Answer: A**

7. What is a biomarker?
- A) A type of enzyme
- B) A molecule used in PCR
- C) An indicator of biological processes or conditions
- D) A protein structure

- **Answer: C**

8. What does LC-MS stand for in metabolomics?
- A) Liquid Chromatography-Mass Spectrometry
- B) Lysine-Cell Mass Spectrometry
- C) Long-chain Metabolite Spectroscopy
- D) Lactic Acid-Methionine Synthesis
- **Answer: A**

9. Which software tool is commonly used for metabolomics data analysis?
- A) Microsoft Excel
- B) Adobe Photoshop
- C) SIMCA
- D) Polymerase chain reaction (PCR)
- **Answer: C**

10. What is the primary goal of metabolomics data interpretation?
- A) To create 3D models of metabolites
- B) To identify potential biomarkers
- C) To study cell division
- D) To analyze gene expression
- **Answer: B**

11. What is the role of metabolomics in personalized medicine?
- A) To study plant metabolism
- B) To analyze DNA sequences
- C) To identify individualized treatment approaches based on metabolite profiles
- D) To perform protein assays
- **Answer: C**

12. Which type of sample is commonly used in metabolomics studies?
- A) Blood
- B) Urine
- C) Plant tissues
- D) All of the above
- **Answer: D**

13. What is the purpose of metabolite extraction from biological samples?
- A) To study gene expression
- B) To isolate proteins
- C) To obtain metabolite profiles for analysis
- D) To perform PCR
- **Answer: C**

14. Which technique is used for metabolomics data visualization?
- A) Electron microscopy
- B) Nuclear magnetic resonance (NMR)
- C) Gel electrophoresis
- D) Western blotting
- **Answer: B**

15. What is the advantage of using mass spectrometry in metabolomics?
- A) It can only detect proteins
- B) It provides high sensitivity and specificity
- C) It requires large sample volumes
- D) It is limited to analyzing DNA sequences
- **Answer: B**

16. Which of the following is a metabolomics database?

- A) Enzyme Commission (EC)
- B) Kyoto Encyclopedia of Genes and Genomes (KEGG)
- C) Polymerase chain reaction (PCR)
- D) Gel electrophoresis
- **Answer: B**

17)Which aspect of sample preparation in metabolomics aims to account for instrumental noise and background contamination?

a) Replicates
b) Samples blanks
c) Extraction methodology optimization
d) Plasticizer detection

Answer: B

18)Which spectroscopic technique is considered non-destructive and is utilized in metabolomics for analyzing small molecules?

a) Raman Spectroscopy (RS)
b) Nuclear magnetic resonance spectroscopy (NMR)
c) Fourier-transform infrared spectroscopy (FTIR)
d) Surface-enhanced Raman scattering (SERS)

Answer:C

19)What is the term used to describe the complete set of all low-molecular-weight metabolites found in a biological sample?

a) Metabolic Profile
b) Metabolic Intermediates
c) Metabolome
d) Lipidome

Answer:C

20)Which component is NOT typically part of a mass spectrometry system operation?

a) High speed switching micro electronics
b) Electric/magnetic field
c) Vacuum system
d) Electromagnetic radiation source

Answer: D

21)What is the main focus of metabolomics in studying small molecules within biological systems?

a) Reflecting the underlying biochemical activity and state of cells/tissues
b) Quantifying protein expression levels

c) Measuring physical characteristics of cells
d) Identifying genetic mutations

Answer: A

22)What is the analysis of all lipids, their interactions, and functions within biological systems known as?

a. Metabolomics
b. Lipidomics
c. Metabolic profiling
d. Proteomics

Answer: B

23) Metabolomics involves the study of...?

a) mRNA
b) Genes
c) Metabolites
d) Proteins

Answer: C

24)Which of the following classes of molecules could be defined as small molecules?

a) tRNA
b) Polymers
c) Lipids
d) Amino acids

Answer: C

25)Metabolomics can help to develop early-detection systems to improve healthcare.

a) True
b) False

Answer: A

Seloo Colleges, Congress Nagar, Nagpur. SEAL

Ms. PayalTalekar
Course- Coordinator
Add on Course

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Practical Exam Question Paper:

Subject :**Metabolomics**

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

Time : 5hrs per day

Dates : 06/03/2024

Max. Marks: 40

Q.1. To perform Metabolite Extraction Technique 10

Q.2. To perform Data Processing and Analysis 10

Q.3. Viva-Voce 10

Q.4. Practical Record 10

Total Marks 40

Science College, Congress Nagar, Nagpur. SEAL

Talekar

Ms. Payal Talekar
Course- Coordinator
Add on Course

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

OMR Answer Sheet

Shri Shivaji Education Society, Amravati's

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Institutional Member of APQN
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Mentor College under 'PARAMARSH Scheme', UGC, New Delhi

U.G. DEPARTMENT OF BIOTECHNOLOGY

Add-on Course

Course Exam Name: Metabolomics

Name of Student: Isha S. Ambulkar

Roll No.:

Session: 2023-24

Test Date: 28/02/2024

Max. Marks: 50

Palekar
Invigilator Signature

Obtained Marks: 46

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	○	●	○	○
6	●	○	○	○
7	○	○	●	○
8	●	○	○	○
9	○	○	●	○
10	○	●	○	○
11	○	○	●	○
12	○	○	○	●
13	○	○	●	○
14	○	●	○	○
15	○	●	○	○
16	○	●	○	○
17	○	●	○	○
18	○	○	●	○
19	○	○	●	○
20	○	○	○	●
21	●	○	○	○
22	○	●	○	○
23	○	○	○	●
24	○	●	○	○
25	●	○	○	○
26	○	○	○	○
27	○	○	○	○
28	○	○	○	○
29	○	○	○	○
30	○	○	○	○
31	○	○	○	○
32	○	○	○	○
33	○	○	○	○
34	○	○	○	○
35	○	○	○	○
36	○	○	○	○
37	○	○	○	○
38	○	○	○	○
39	○	○	○	○
40	○	○	○	○
41	○	○	○	○
42	○	○	○	○
43	○	○	○	○
44	○	○	○	○
45	○	○	○	○
46	○	○	○	○
47	○	○	○	○
48	○	○	○	○
49	○	○	○	○
50	○	○	○	○

UG Department of Biotechnology

Mark List: Add on Course- Metabolomics (Session 2023-2024)

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)	AMBULKARISHAPRADNYANAND	46	39	10	95	O
2)	ANMADWARKHUSHIRAJENDRA	42	34	10	86	A+
3)	BAHADUREVANSHITADHARMAPAL	48	36	10	94	O
4)	BHAGWATKETKIAVIRAJ	48	36	10	94	O
5)	BHALKARGAURIABHIJIT	AB	AB	AB	AB	AB
6)	BINEKARMANSISEVAK	48	35	10	93	O
7)	BISENRIYADELIRAM	46	35	10	91	O
8)	BORKARMANSVIRAVI	50	37	10	97	O
9)	BORKARNANDINIRAMKRUSHNA	48	36	10	94	O
10)	BORKARSHREYASHADINESH	42	35	10	87	A+
11)	BUDDHALWARSIDDHIVYANKATESH	48	36	10	94	O
12)	BUDHEVINAYRAJENDRA	50	35	10	95	O
13)	CHAUHANSHANTANUSINGHSHAILENDRASINGH	48	35	10	93	O

14)	CHOUDHARISHRAVANIRAMESH	46	35	10	91	O
15)	DAHATSURBHIYOGRAJ	50	35	10	95	O
16)	DAHERIYAJAYSIKARAMKISHAN	48	36	10	94	O
17)	DAHIKARSARWANIATUL	50	38	10	98	O
18)	DASCHETANASHAKTIPRASAD	46	39	10	95	O
19)	DATARKARNAYANPRAKASHRAO	42	34	10	86	A+
20)	DHOTESHRISHTIRAVINDRA	48	36	10	94	O
21)	DOYEPRANALISHRIKRUSHNA	48	36	10	94	O
22)	GARODEGARGISHAILESH	50	38	10	98	O
23)	GHOLSELEENABHOJRAJ	AB	AB	AB	AB	AB
24)	GIRIYASHDILIP	50	37	10	97	O
25)	GODSESIDDHIMADHAV	48	36	10	94	O
26)	GOTMAREPARIKSHITDEEPAK	42	35	10	87	A+
27)	GURVEADITIRAMKRUSHNA	48	36	10	94	O
28)	HADKETEJASVINITIN	46	39	10	95	O
29)	JAINSHRUTIRAVIKUMAR	42	34	10	86	A+
30)	JENEKARSHREYANARENDRA	48	36	10	94	O

31)	KADUKARTIKVIVEK	48	36	10	94	O
32)	KALEVAIDEHIGIRISH	50	38	10	98	O
33)	KAMANESAURABHJAGDISH	50	35	10	95	O
34)	KAMBLESHATAKSHIVIJAY	50	37	10	97	O
35)	KHADSE ISHAESHWAR	48	36	10	94	O
36)	KHAPARDESOURABHIRAJENDRA	42	35	10	87	A+
37)	KHEDULETASHUVIPUL	48	36	10	94	O
38)	KHOBRAGADEBHAVESH SUBHASH	50	38	10	98	O
39)	KOHAD PURVASANJAY	46	39	10	95	O
40)	KOLHEYASHASWIPRAVIN	42	34	10	86	A+
41)	KUDKELWARJANHVIRAVI	48	36	10	94	O
42)	LANDESONALIRAJENDRA	48	36	10	94	O
43)	LOHAKARESHRAVNIKAWADU	50	38	10	98	O
44)	MADAVIMAITHILIPRABHAKAR	50	37	10	97	O
45)	MAHANTABHILASHACHANDRASHEKHAR	48	36	10	94	O
46)	MANWATKARMAHIPRAMOD	42	35	10	87	A+
47)	MASRAMSAMRUDHISUBHASH	48	36	10	94	O

48)	MESHRAMSHRIVINNAVIN	50	37	10	97	O
49)	NAGBHIDKARASTHASANJAY	48	35	10	93	O
50)	NANDANWARSANIYAMURLIDHAR	46	35	10	91	O
51)	NIKOSEVAISHNAVIVASANTA	46	39	10	95	O
52)	NINAWERAKHISANJAY	42	34	10	86	A+
53)	NIPANEDARSHIKADINDAYAL	48	36	10	94	O
54)	PARMARESHIKARAJU	48	36	10	94	O
55)	PATHEMANSIHANUMAN	50	38	10	98	O
56)	PATLENITALPRALHAD	48	35	10	93	O
57)	PATLEVAIBHAVSAHADEO	46	35	10	91	O
58)	PATLEVINARSNAYARAN	50	37	10	97	O
59)	PURKAMSANSKRUTIKISHOR	50	38	10	98	O
60)	RAHANGDALEKAJALTULSHIDAS	46	39	10	95	O
61)	RAMTEKERUTUJASHAILESH	42	34	10	80	A+
62)	RAUTKHUSHIBHALCHANDRA	48	36	10	94	O
63)	RAUTNETRANARENDRA	48	36	10	94	O
64)	SALUJA MANMEETKAUR RANJEETSINGH	50	38	10	98	O

65)	SEPURWARRIYARAJENDRA	48	35	10	93	O
66)	SHEIKHRAFIYAANJUMINTEYAJAHMAD	46	35	10	91	O
67)	SHRIRAMESEJALSHANKAR	50	37	10	97	O
68)	SHRIWASBHUMIKASUSHIL	48	35	10	93	O
69)	TALEJAHANVISURESHKUMAR	46	35	10	91	O
70)	TALHARSHRUTIAVINASH	50	37	10	97	O
71)	TELANGVAIDEHIVIVEK	48	36	10	94	O
72)	TITARMARERENUKAAJAY	42	35	10	87	A+
73)	UIKEYSEJWALSANJAY	48	36	10	94	O
74)	UMREDKARBHAVINEEANIL	50	37	10	97	O
75)	WADASKARNANDINIARVIND	46	39	10	95	O
76)	WAGDENANDINIHEMANT	42	34	10	86	A+
77)	WAGHANUSHKAVIKRAM	48	36	10	94	O
78)	WAGHAMARE MRUNALIMORESHWAR	48	36	10	94	O
79)	WANKHEDEDURVESHNILESH	50	38	10	98	O
80)	WANKHEDEKANCHANVINOD	50	37	10	97	O
81)	WASNIKASTHASUNIL	48	36	10	94	O

82)	YADAVJIYAASHOK	42	35	10	87	A+

Ms. Payal Talekar
Course- Coordinator
Add on Course

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CERTIFICATE

Mr./Ku. Ambulkar Isha Pradnyam is awarded with certificate on successful completion of the course entitled, Certificate course in **"Metabolomics"**

Session 2023-24 under Add-on course conducted for **30 hours from 15/12/2023 to 24/02/2024** by Department of Biotechnology, SSESA's, Science College, congress Nagar, Nagpur 440012.

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

Talekar

Ms. Payal Talekar

Coordinator, Department of Biotechnology

SEAL

MDhore

Prof. M. P. Dhore

Principal, Science College, Nagpur

UG Department of Biotechnology

Add on Course: Metabolomics (Session 2023-24)

Feedback form

Thank you for participating in our Add on course Metabolomics. Your feedback is crucial in helping us improve the course and enhance your learning experience. Please take a few moments to complete this feedback form.

Que. 1 **How would you rate the overall quality of the Add on Course –Metabolomics**

a) Excellent
b) Good
c) Average

Que. 2 **How well did the Add on Course – Metabolomics meet your expectations?**

a) Exceeded expectations
b) Met expectations
c) Below expectations

Que. 3 **How effective were the course instructors in delivering the Add on Course – Metabolomics**

a) Very effective
b) Effective
c) Ineffective

Que. 4 **How likely are you to recommend the Add on Course –Metabolomics to others?**

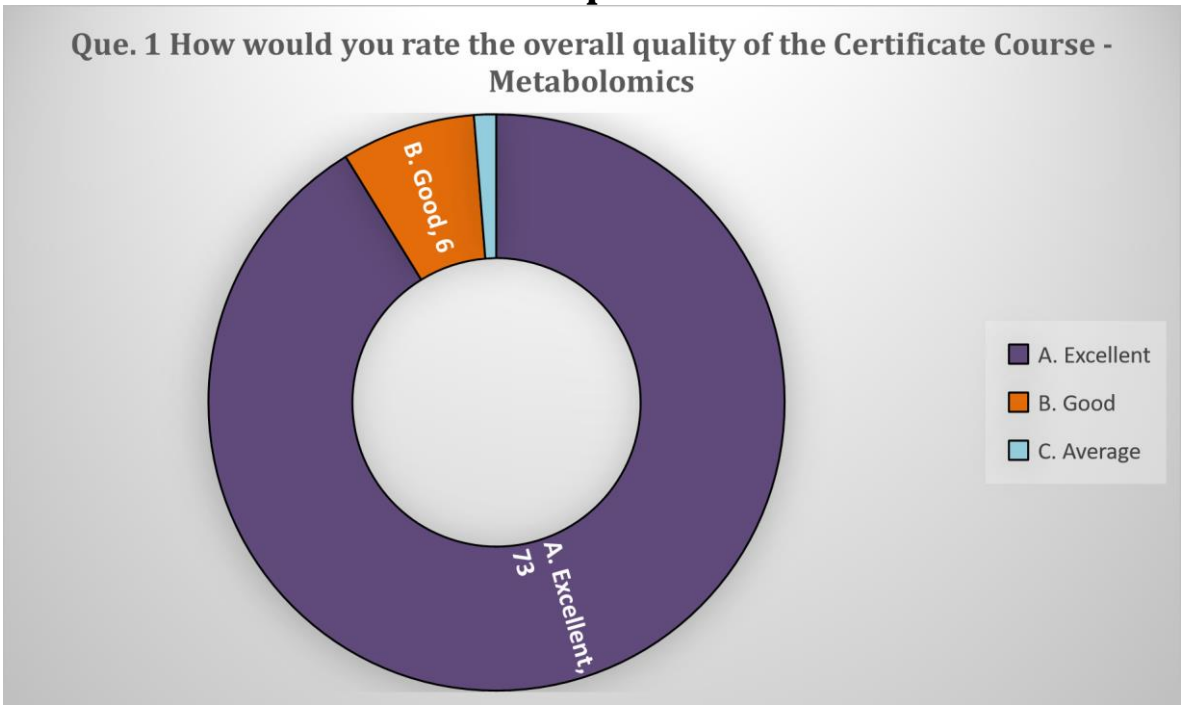
a) Very Likely
b) Likely
c) Unlikely

Que. 5 **How satisfied are you with the practical sessions of the Add on Course – Metabolomics?**

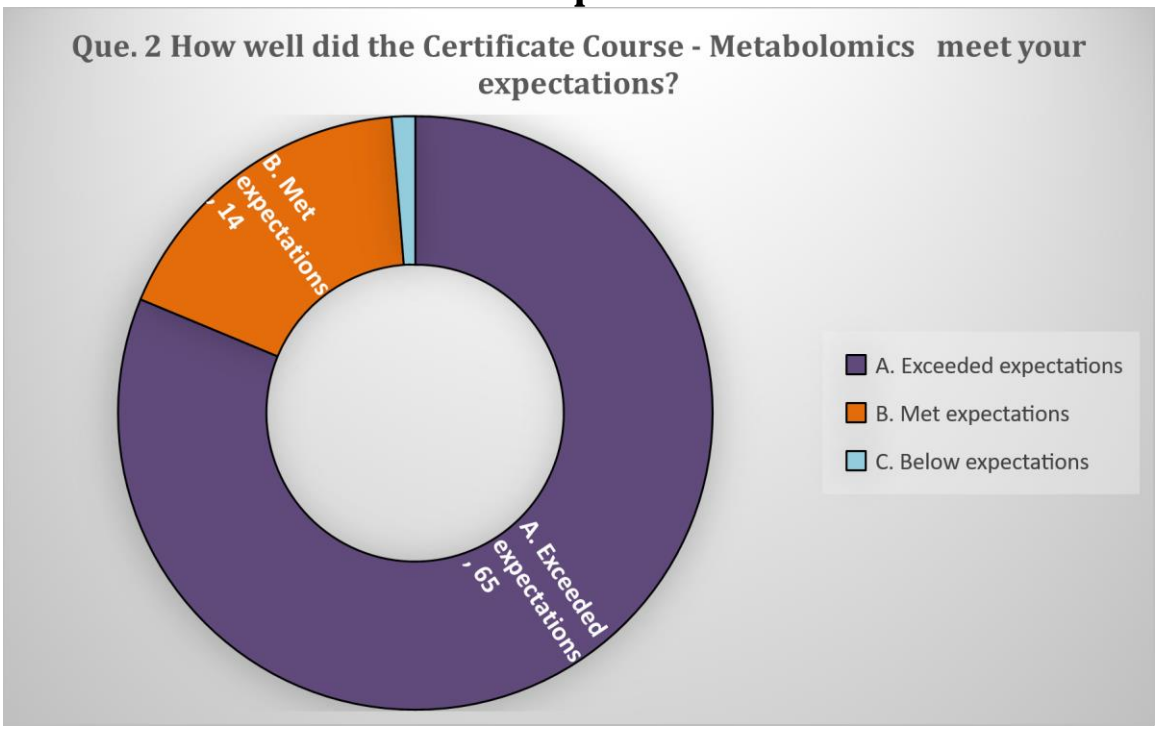
a) Very Satisfied
b) Satisfied
c) Dissatisfied

UG Department of Biotechnology
Add on Course: Metabolomics (Session 2023-24)
Feedback Response

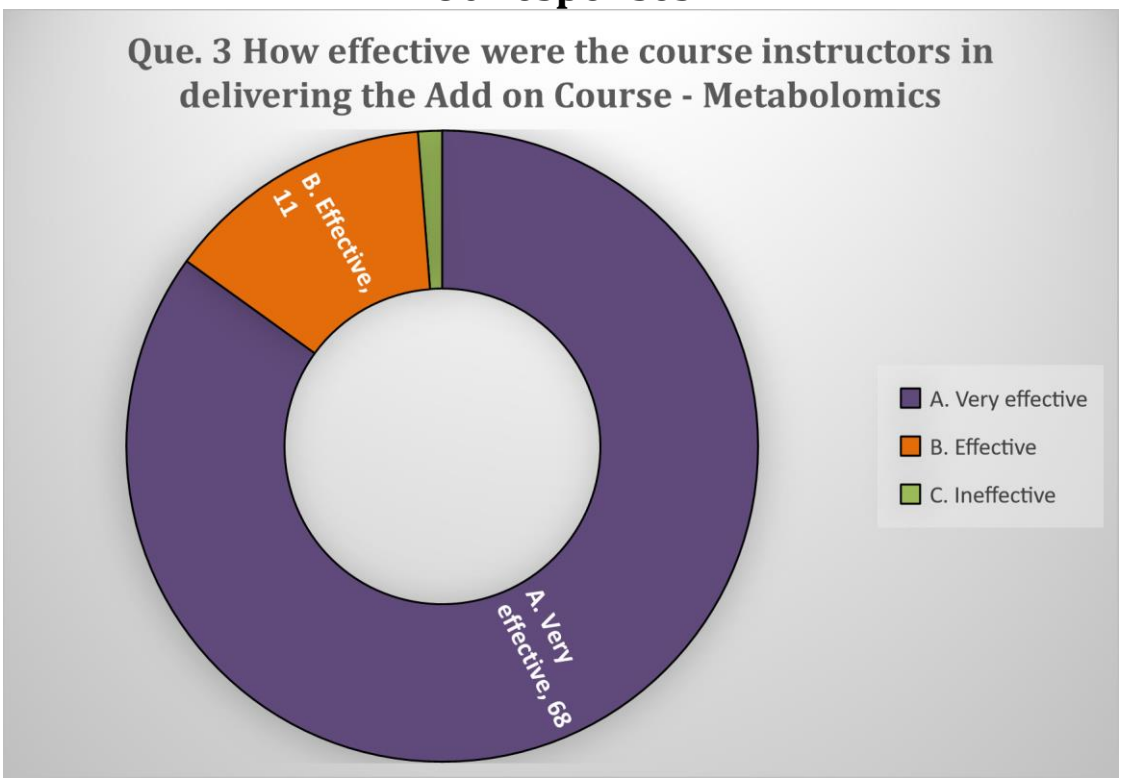
80 responses



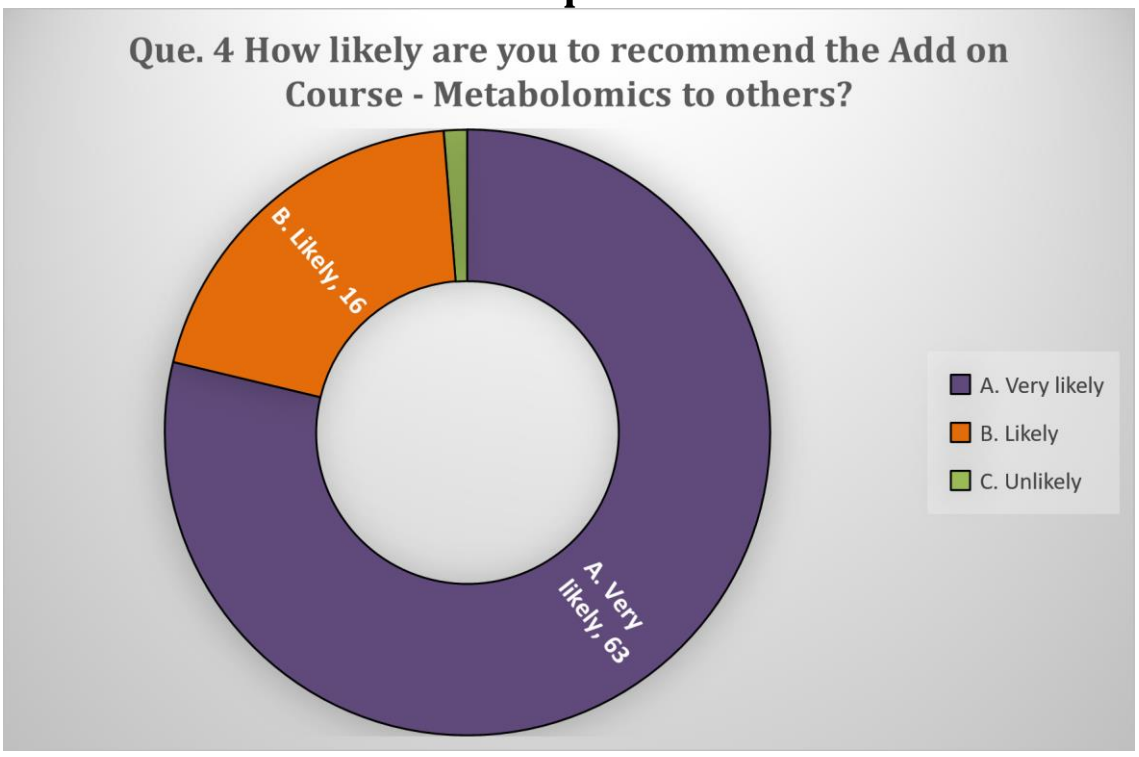
80 responses



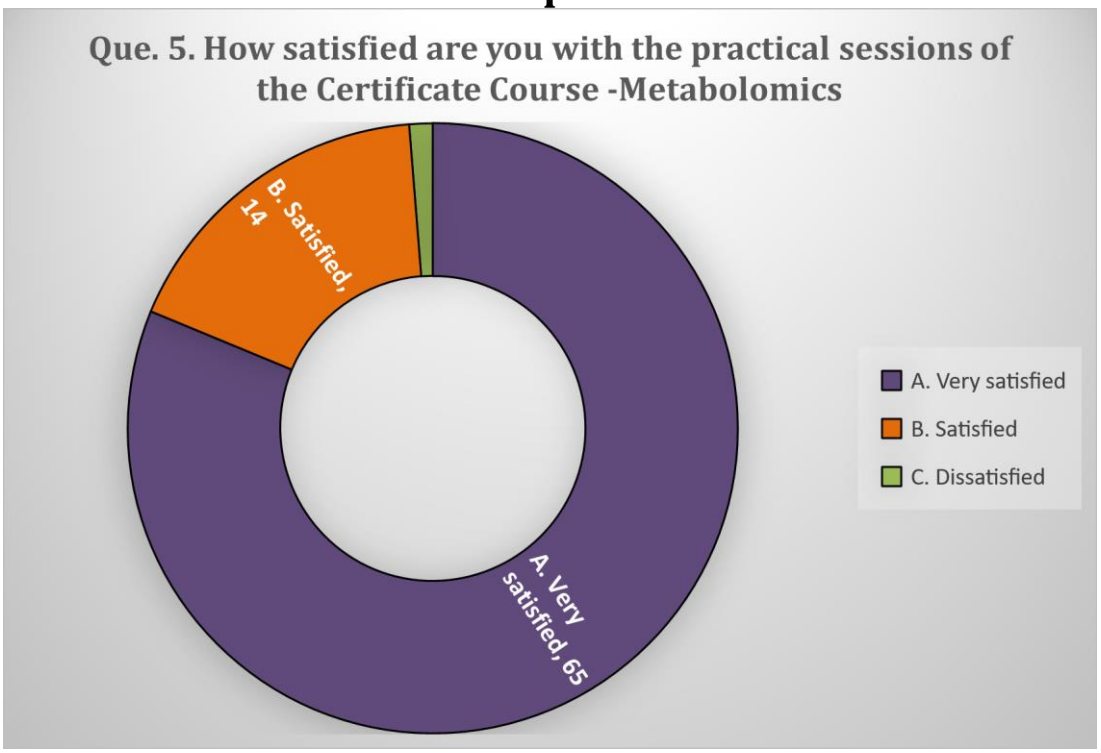
80 responses



80 responses



80 responses



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