



DEPARTMENT OF MICROBIOLOGY
MUHAMMED ABDURAHIMAN MEMORIAL
ORPHANAGE (MAMO) COLLEGE

[Govt. Aided First Grade College & Affiliated to University of Calicut.
Re-Accredited by NAAC with A Grade]

CURRICULUM FOR CERTIFICATE
COURSE IN

CERMB004: MICROBIOLOGICAL
SAMPLING OF AIR

OFFERED DURING THE
ACADEMIC YEAR 2018-19
[APPROVED BY ACADEMIC COMMITTEE, MAMO COLLEGE]



MANASSERY, MUKKAM POST,
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INSTITUTIONAL VISION, MISSION & OBJECTIVES 01



VISION

VISION: Build Scientifically Oriented, Intellectually Accomplished, Morally Upright and Socially Committed youth who can play a constructive role in Nation Building.



MISSION

MISSION: Intellectual, social and economic empowerment of the youth in general and women, minorities, orphans and the destitute in particular by providing quality, value-based higher-education.



OBJECTIVES

OBJECTIVES: Pursuit of Excellence, Harnessing technology, Thrust on value-based education, Nurturing Excellence and Moulding the youth for Nation Building.



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VISION, MISSION, OBJECTIVES & CORE VALUES OF THE DEPARTMENT **02**



VISION

VISION: To brim the upcoming generation with Scientific Knowledge.



MISSION

MISSION: Providing quality education and training to bring out the very best in students through the stimulus of scholarly progression and intellectual development.



OBJECTIVES: (a) Empowerment of the students with scientific background and the technical skills, (b) Empower the students to be an entrepreneur in the field of Microbiology and allied areas.



VALUES

CORE VALUES: Accountability, Communication, inclusivity, innovation, Industrial excellence, Professionalism, Teamwork and tolerance.



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B.Sc MICROBIOLOGY: PROGRAMME EDUCATIONAL OBJECTIVES [PEOs] 03

After 4 to 5 years of graduation, the career and professional accomplishments attained by the Microbiology Graduates would reflect that the programme really prepared the graduates to deal with the real world, where they could apply and use the skills and knowledge they have learned to good use.

Specifically, the graduate would be able to:



PEO1: Pursue any of the following three alternatives: (i) immediately take up a career in any area of Microbiology and work productively as a successful microbiologist in diverse career paths including supportive and leadership roles on multidisciplinary teams. (ii) Broaden the scope of the career path by pursuing higher studies and research in the field of Microbiology. (iii) Go for taking up the challenge and spearheads start-ups by positively exploiting the diverse potentials of the microbiological field.



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PEO2: Graduates will communicate effectively, recognize and incorporate societal needs and constraints in their professional endeavours, and practise their profession with high regard to legal and ethical responsibilities.



PEO3: Be original, creative, innovative and systematic in their all endeavours, including individual, collaborative and entrepreneurial ventures with meticulous strategic thinking, planning and execution.



PEO4: Have sufficient breadth of understanding to enable continued professional development and lifelong learning throughout their career.



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B.Sc MICROBIOLOGY: PROGRAMME SPECIFIC OUTCOME [PSOs] 04

On successful completion of a Bachelor Degree in Microbiology, the graduates would be able to:



PSO1: The students able to understand the theoretical knowledge in the field of microbiology like general, analytical, clinical, food and industrial sectors.



PSO2: The students able to expertise in applying practical knowledge in medical, biochemical and industrial sectors.



PSO3: The students acquire research knowledge in industrial training and summative projects.



PSO4: The students able to analyse socially acceptable solutions to complex environmental problems with applications of modern and appropriate techniques for sustainable development.



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PSO5: The students able to create bio products like microbial inoculums, biologically active compounds and probiotics.



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B.Sc MICROBIOLOGY: PROGRAMME OUTCOMES [POs] 05

The students graduating from B.Sc Microbiology Programme should be able to:



PO1: SCIENTIFIC & COMPUTING KNOWLEDGE: Apply scientific and practical methods to analyse microorganisms from different sources.



PO2: PROBLEM ANALYSIS: Identify, formulate, review research literature, and analyze complex real-life problems reaching substantiated conclusions using first principles of statistics, natural sciences, and bioinformatics.



PO3: DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex real-life problems or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.



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PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.



PO5: MODERN TOOL USAGE: Apply appropriate and modern practical techniques, resources, and modern bioinformatics software including prediction and modeling to complex biomolecules with an understanding of the limitations.



PO6: THE MICROBIOLOGICAL PROFESSION AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.



PO7: ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the environmental pollutions and their solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.



PO8: ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the microbiological practice.



PO9: INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.



PO10: COMMUNICATION: Communicate effectively on complex microbial activities with the community and



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with society, such as, being able to comprehend and write effective reports and analyse the microbial activities, make effective presentations, and give and receive clear instructions.



PO11: PROJECT MANAGEMENT AND FINANCE:

Demonstrate knowledge and understanding of the microbiological principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.



PO12: LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of changing environment.



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CERTIFICATE COURSE

CERMB004: HISTORY OF MICROBIOLOGY 06

COURSE CURRICULUM

Course Name	Microbiological Sampling of Air
Course Code	CERMB004
Year	2018-19
Course Designer	Ms. Sana M A
Couse Duration	30 Hrs
Course Schedule	June to September
Maximum Students Intake	60 Students



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1. COURSE LEVEL

Foundational, skill-oriented certificate programme.

2. PREREQUISITE

None.

3. COURSE INTAKE & ADMISSION

Maximum 60 students will be given admission to the course based on First-Come-First-Serve basis. All the students of the MAMO College are eligible for free enrolment for the course. The enrolment notification will be issued for the course well in advance of the commencement of the course.

4. COURSE COORDINATOR

Ms. Sana M A, Assistant Professor, Department of Microbiology.

5. COURSE PREAMBLE

The course is designed to provide the basic knowledge in microbial contaminants in air and its sampling and monitoring. The practical nature of the course means plenty of hands on experience to complement the theory.

6. DURATION

Total Duration: 30 Hrs. [Contact Hrs. 16 Hrs, Course Woks: 7 and Assessment Works: 7]

7. CURRICULUM FOCUS

Enhance the employability of the learners through curriculum enrichment for additional skill development.



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8. COURSE OBJECTIVES

Learners are expected to

- (a) Learn about specific environmental quality parameters .
- (b) Know more about techniques for measurement and sampling

9. SKILL EXPECTED

On the successful completion of the course, learners will be able to:

- (a) Detect microbial pollutants in the environment.
- (b) Learners can enumerate the microbial load.
- (c) Distinguish between bacterial, fungal and protozoal contaminants

10. COURSE OUTCOMES

Upon the successful completion of the course, the learners will be able to:

CO No	Course Outcome(CO)	Skill/Knowledge Attainment Level Based on Revised Bloom's Taxonomy
CO1	Provide basics of air sampling and monitoring air quality.	Understand
CO2	Learners will be able to develop and carry out a air monitoring programme.	Understand
CO3	To give an insight into the effects of microbial contaminants in the air.	Analyse
CO4	To facilitate an understanding of the basics of air sampling and monitoring.	Understand



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CO No	Course Outcome(CO)	Skill/Knowledge Attainment Level Based on Revised Bloom's Taxonomy
CO5	To compare between bacterial ,fungal contaminants in air.	Comparison

11. MAPPING OF COs WITH PSO_s AND PO_s

CO _s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	0	1	0	1	1	1	1	1	2	2	0	1	2	1	0	1	1
CO2	2	0	2	1	0	1	1	0	2	3	1	2	0	1	2	1	1
CO3	1	1	0	3	1	2	1	1	2	0	1	3	1	2	1	0	1
CO4	3	0	2	1	1	0	1	2	2	3	1	2	3	1	2	1	1
CO5	1	0	2	1	1	0	1	1	2	3	1	2	1	1	2	1	1
AVG	1.4	0.4	1.2	1.4	0.8	0.8	1	1	2	2.2	0.8	2	1.4	1.2	1.4	0.8	1

12. MODULE-WISE COURSE CONTENTS

MODULE 1: INTRODUCE TO NATURE OF ATMOSPHERE.

MODULE DURATION: 10 Hrs. [Contact Hrs. 4 Hrs. Course Works: 3 and Assessment Works: 3]

MODULE CONTENT: Nature and types of microorganisms in air , distribution and sources , indoor and outdoor air.



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MODULE OUTCOME: On successful completion of this module, learners can develop an understanding of nature of atmosphere, such that an appropriate monitoring strategy can be drawn up to suitable situations.

MODULE 2: DIFFERENT METHODS OF MICROBIAL SAMPLING OF AIR

MODULE DURATION: 10 Hrs. [Contact Hrs. 4 Hrs. Course Works: 3 and Assessment Works: 3]

MODULE CONTENT: Gravity slide, plate exposure, Hirst spore trap, Impingement onto liquid and solid media, Thermal precipitation.

MODULE OUTCOME: On successful completion of the module learners are equipped with the knowledge and skills required to operate sampling devices.

MODULE 3: ADVANTAGES AND DISADVANTAGES OF AIR SAMPLING

MODULE DURATION: 10 Hrs. [Contact Hrs. 4 Hrs. Course Works: 3 and Assessment Works: 3]

MODULE CONTENT: Merits and demerits of air sampling and their applications.

MODULE OUTCOME: On successful completion of the module learners will be able understand the practical application of air monitoring and will be able to choose apt method for air sampling.

REFERENCES:

1. *Methods of Air Sampling Analysis*, American public health association 2nd edition.



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2. Berdel R Funke, *Textbook of Microbiology: An Introduction*, Gerard. J. Tortora.
3. Textbook of Environmental Microbiology. Pepper and Maier.

ADDITIONAL REFERENCES & STUDY MATERIALS

4. <https://nptel.ac.in/courses/103/106/103106162/>
5. <https://onlinecourses.nptel.ac.in/noc20ch01/preview>
6. <https://nptel.ac.in/courses/105/102/105102089/>

13. DELIVERY MODE

The course employs multi-mode delivery mechanisms including contact lecture, online MOOC courses from NPTEL, Online and offline course works.

14. DELIVERY SCHEDULE

June to September.

15. DETAILED COURSE DELIVERY PLAN

Hour	Delivery Mode and Activity	Topics to be Covered
1	Contact Hour - 1: Classroom Discussion	Introducing the Course
2	Lab Hour - 1	Preparation of various medias for sampling.
3	Contact Hour - 2: Classroom Demonstration	Nature and types of microorganisms in air and its distribution .
4	Contact Hour - 3: Classroom Demonstration	Indoor and outdoor air.



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Hour	Delivery Mode and Activity	Topics to be Covered
5	Contact Hour - 4: Classroom Demonstration	Air sampling and various types of sampling.
6	Contact Hour - 5: Classroom Demonstration	Major principles of air sampling.
7	Contact Hour - 6: Classroom Demonstration	Various equipments works on this principles..
8	Lab Hour - 2	Plate exposure method for enumerating microorganisms in air.
9	Course Work – 1: Course Assignment	Course assignment to make notes on major applications and use of air sampling.
10	Course Work – 2: Course Assignment	Course Assignment to make notes on methods on settling under gravity principle.
11	Assessment Hour - 1	Assignment to prepare notes on methods on impingement techniques.
12	Course Work – 3: Course Assignment	Course Assignment prepare notes on centrifugation principle.
13	Assessment Hour - 2	Assignment to prepare notes on filtration principle.
14	Contact Hour - 7: Classroom Demonstration	Modern methods for air sampling.
15	Contact Hour - 8: Classroom Demonstration	Advantages and disadvantages of air sampling.
16	Lab Hour - 3	Enumeration of bacterial colonies using colony counters.
17	Lab Hour - 4	Gravity slide technique.



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Hour	Delivery Mode and Activity	Topics to be Covered
18	Lab Hour - 5	Impingement onto solid media
19	Course Work – 4: Course Assignment	Course Assignment to ensure their knowledge on basic principles of air sampling.
20	Course Work – 5: Course Assignment	Course Assignment to prepare notes on thermal precipitation methods .
21	Lab Hour - 6	Hollander dalla valle tube method
22	Lab Hour - 7	Anderson method
23	Lab Hour - 8	Slit method.
24	Assessment Hour - 3	Assignment to prepare notes on Anderson method
25	Assessment Hour - 4	Assignment to prepare notes on agricultural applications of air sampling
26	Assessment Hour - 4	Assignment to prepare notes on agricultural applications of air sampling
27	Course Work – 6: Course Assignment	Course Assignment on medical applications of air sampling
28	Course Work – 7: Course Assignment	Course Assignment to prepare notes on advantages and disadvantages of air sampling.
29	Assessment Hour - 5	Course End Assessment
30	Assessment Hour - 4	Assignment to prepare notes on agricultural applications of air sampling



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MUHAMMED ABDURAHIMAN MEMORIAL ORPHANAGE (MAMO) COLLEGE

[Govt. Aided First Grade College & Affiliated to University of Calicut.
Re-Accredited by NAAC with A Grade]

DEPARTMENT OF MICROBIOLOGY

CURRICULUM FOR CERTIFICATE COURSE - CERMB004

16. ASSESSMENT COMPONENTS

Total Marks: 100

CLASSROOM AND GROUP PARTICIPATION: 20 Marks. This component aims at testing the course content understanding and the reflection skills and their attainment levels.

COURSE WORK: 30 Marks. This component aims at testing the skill attainment levels of the learners in analysing and implementing the real-world problem.

MID-COURSE ASSIGNMENT: 20 Marks. This component aims at testing the module-wise attainment levels of the course objectives and course outcome and module outcomes.

END-COURSE ASSESSMENT: 30 Marks. This component aims at testing overall attainment levels of the course with respect to course objectives, course outcome and module outcomes.

17. COURSE EVALUATION & GRADING

The course evaluation is done/coordinated entirely by the course coordinator. The following 10-point Indirect Grading System is used for awarding grades to students:

Percentage of Mark	Letter Grade	Interpretation	Class
95 and above	O	Outstanding	First Class with Distinction
85 to below 95	A+	Excellent	First Class with Distinction
75 to below 85	A	Very good	First Class with Distinction
65 to below 75	B+	Good	First Class
55 to below 65	B	Satisfactory	First Class
45 to below 55	C	Average	Second Class



Manassery, Mukkam Post,
Kozhikode, Kerala, India, 673 602.
email: mamocollege@gmail.com



Office: 0495-2297319
Principal: 0495-2295121



www.mamocollege.org


COORDINATOR
ACADEMIC COMMITTEE
MUHAMMED ABDURAHIMAN MEMORIAL
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Percentage of Mark	Letter Grade	Interpretation	Class
35 to below 45	P	Pass	Third Class
Below 35	F	Failure	Fail
Incomplete	I	Incomplete	Fail
Absent	Ab	Absent	Fail

The grade is awarded by the course-coordinator by considering the overall performance of the learner in all the assessment component of the course.

18. GRIEVANCE REDRESSAL

The grievances, if any, can be submitted to the Head of the Department for its redressal. Those grievances that cannot be redressed by HoD can be forwarded to Academic Council of the College for final decision on the matter.

19. ISSUANCE OF CERTIFICATES

The Course Completion Certificate will be issued to all the successful candidates showing the Total Marks and Grade Obtained.



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