



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

CERMB001: VIRULENCE AND
PATHOGENICITY

OFFERED DURING THE
ACADEMIC YEAR 2016-17
[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

CERMB001: VIRULENCE AND PATHOGENICITY **06**

COURSE CURRICULUM

Course Name	Virulence and Pathogenicity
Course Code	CERMB001
Year	2016-17
Course Designer	Mr. Lukman A
Course Duration	30 Hrs
Course Schedule	November to February
Maximum Students Intake	60 Students



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1. COURSE LEVEL

Technical knowledge enhancing certificate programme.

2. PREREQUISITE

Knowledge of pathogenicity and virulence of bacteria.

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

Mr. Lukman A, Assistant Professor, Department of Microbiology.

5. COURSE PREAMBLE

The goal of this course are to have the students gain a basic understanding of the kinds of virulence factors used by pathogenic bacteria to cause disease, how we discover and study those traits, and how we discover and study those traits and how we can make use of this knowledge for treatment and prevention of bacterial disease.

6. DURATION

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



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7. CURRICULUM FOCUS

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

8. COURSE OBJECTIVES

Learners are expected to

- (a) Develop basic awareness about bacterial diseases
- (b) Develop general awareness about disease progression

9. SKILL EXPECTED

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

- (a) Develop awareness about bacterial diseases
- (b) Learn basic idea about disease control measures

10. COURSE OUTCOMES

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

CO No	Course Outcome(CO)	Skill/Knowledge Attainment Level Based on Revised Bloom's Taxonomy
CO1	Describe microbial structure and their relation to basic mechanisms of bacterial pathogenesis.	Understand
CO2	Describe structure ,function and genetics of bacterial toxins	Understand
CO3	Dissect the host resistance and immunity	Analyze



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CO No	Course Outcome(CO)	Skill/Knowledge Attainment Level Based on Revised Bloom's Taxonomy
CO4	Assess the pathogenic organisms of major public health importance	Evaluate
CO5	Create knowledge about disease caused and their epidemiology	Create

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	1	1	0	1	1
CO2	1	0	2	1	0	1	1	1	2	3	1	2	1	1	2	1	1
CO3	1	1	2	1	1	1	1	1	2	0	1	2	1	1	1	1	1
CO4	1	0	2	1	1	0	1	1	2	3	1	2	1	1	2	1	1
CO5	1	0	2	1	1	0	1	1	2	3	1	2	1	1	2	1	1
AVG	0.8	0.4	1.6	1	0.8	0.6	1	1	2	2.2	0.8	1.8	1	1	1.4	1	1

12. MODULE-WISE COURSE CONTENTS

MODULE 1: INTRODUCTION TO MICROBIAL PATHOGENICITY

MODULE DURATION: 13 Hrs. [Contact Hrs. 6 Hrs. Course Works: 3 and Assessment Works: 4]



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MODULE CONTENT: Microbial structures and their relation to basic mechanisms of bacterial pathogenesis, structure, function and genetics of bacterial toxins and post resistance and immunity.

MODULE OUTCOME: After this module, students will be able to understand the basic knowledge about the pathogenicity and virulence and basics on immunity.

MODULE 2: VIRULENCE FACTORS

MODULE DURATION: 17Hrs. [Contact Hrs. 10 Hrs. Course Works: 4 and Assessment Works: 3]

MODULE CONTENT: Microorganism and infectious diseases a historical perspective, Host susceptibility to infection

MODULE OUTCOME: On successful completion of the module learners will be able to understand the Microorganism and infectious diseases.

MODULE 3: BACTERIAL TOXINS AND DISEASES

MODULE DURATION: 17Hrs. [Contact Hrs. 10 Hrs. Course Works: 4 and Assessment Works: 3]

MODULE CONTENT: The case for DT, cholera, shiga, pertussis, botulinum, anthrax.

MODULE OUTCOME: On successful completion of the module learners will be able to understand the bacterial toxins.

REFERENCES:

1. David Greenwood, Slack, Peutherer, *Medical Microbiology*.



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- Ananthanarayan R and Paniker C. K. J. (2005). *Textbook of Microbiology*. 7th edition

ADDITIONAL REFERENCES & STUDY MATERIALS:

- Goering R, Dockrell H, Zuckerman M and Wakelin D. (2007). *Mims' Medical Microbiology*. 4th edition. Elsevier.

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

November to February.

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	Basic idea of microbes.
3	Contact Hour - 2: Classroom Demonstration	Basic concept of pathogen
4	Contact Hour - 3: Classroom Demonstration	Immune mechanism of host cell
5	Contact Hour - 4: Classroom Demonstration	Various types of immunity
6	Contact Hour - 5: Classroom Demonstration	Antigen Antibody reactions
7	Contact Hour - 6: Classroom Demonstration	Introducing about bacterial toxins



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Hour	Delivery Mode and Activity	Topics to be Covered
8	Lab Hour - 2	Microbiological analysis of organisms
9	Course Work – 1: Course Assignment	Course Assignment to write note on infectious agents
10	Course Work – 2: Course Assignment	Course Assignment to various types of bacterial toxins
11	Assessment Hour - 1	Assignment to ensure the diseases
12	Course Work – 3: Course Assignment	Course Assignment to mechanism of host specific response
13	Assessment Hour - 2	Assignment to ensure the basics of toxins
14	Contact Hour - 7: Classroom Demonstration	Observing through microscope to find the structure of bacteria
15	Contact Hour - 8: Classroom Demonstration	Infectious agents
16	Lab Hour - 3	Isolation of pathogens from various samples
17	Lab Hour - 4	Staining the organisms
18	Lab Hour - 5	Biochemical identification of the organism
19	Course Work – 4: Course Assignment	Course Assignment to make notes on biochemical methods
20	Course Work – 5: Course Assignment	Course Assignment to Create Different culture medias
21	Lab Hour - 6	Observing the antagonistic activity
22	Lab Hour - 7	Observing the antibiotic sensitivity test



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Hour	Delivery Mode and Activity	Topics to be Covered
23	Lab Hour - 8	Identify the organism by staining technique
24	Assessment Hour - 3	Assignment to Create note on phagocytosis
25	Assessment Hour - 4	Assignment to Create notes on toxins
26	Course Work – 6: Course Assignment	Course Assignment to Create note on vaccines
27	Course Work – 7: Course Assignment	Course Assignment to mode of vaccination and their effects
28	Assessment Hour - 5	Course End Assessment
29	Assessment Hour - 6	Course End Assessment
30	Contact Hour - 1: Classroom Discussion	Introducing the Course

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.



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

DEPARTMENT OF MICROBIOLOGY

CURRICULUM FOR CERTIFICATE COURSE - CERMB001

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
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.



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



Office: 0495-2297319
Principal: 0495-2295121

COORDINATOR
ACADEMIC COMMITTEE
MUHAMMED ABDURAHIMAN MEMORIAL
ORPHANAGE COLLEGE
P.O. MANASSERY, MUKKAM - 673602



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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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