

**THOMAS ADEWUMI UNIVERSITY OKO**  
**COURSE OUTLINE**

Faculty	Computing and applied science	
Department	Biological Sciences	
Course title	<b>ANALYTICAL MICROBIOLOGY</b>	
Year of study	3	
Course code	MCB 309	
Credit hours	2	
Contact hours	45	
Mode of delivery	CLASSROOM LECTURES PRACTICAL SESSIONS	
Mode of assessment		WEIGHT%
Continuous assessment		30%
Final examination		70%
Total		100%
Course lecturers and Instructors	MRS F.J. OLAITAN-LECTURER	
Course description	<p>The quality of industrial microbial products is hinged on the conditions of processing, packaging and storage. In microbiology, most products are expected to be sterile till it gets to the consumer. To achieve this, there are some principles and benchmarks that have been highlighted by appropriate authorities. They are widely accepted all over the world and a breach of those guidelines can lead to rejection of products due to the non-sterility and poor quality.</p>	
Course objectives	<p>This course will bring to light;</p> <ol style="list-style-type: none"> <li>1. Safe and good practices in the Microbiological laboratory</li> <li>2. a. Definition of Biosafety cabinet b. types and specification for each type of biosafety cabinet</li> <li>3. Several ways of discarding biohazardous waste such as Disinfection, Autoclaving &amp; Incineration.</li> <li>4. The practices involved in determining Microbes in Food and Pharmaceutical Samples as in culture and microscopic methods, Biochemical and immunological methods, Molecular methods.</li> </ol>	

	<ol style="list-style-type: none"> <li>5. The ways to isolate pathogenic Microorganisms of Importance in Food &amp; Water.</li> <li>6. Safety principles termed HACCP for Food Safety and Microbial Standards Principles, flow diagrams, benefits and limitations</li> <li>7. The microbial standards for different foods and water</li> </ol>
Learning outcomes	<p>By the end of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe and practice safe and good practices in the Microbiology laboratory</li> <li>2. Describe a Biosafety cabinet and the types with respect to the specification for each type.</li> <li>3. Explain several ways of discarding biohazardous waste such as Disinfection, Autoclaving &amp; Incineration.</li> <li>4. Mention and practice in the laboratory the practices involved in determining Microbes in Food and Pharmaceutical Samples as in culture and microscopic methods, Biochemical and immunological methods, Molecular methods.</li> <li>5. Discuss the ways to isolate pathogenic Microorganisms of Importance in Food &amp; Water.</li> <li>6. Explain the principles that make up HACCP for Food Safety and Microbial Standards</li> <li>7. Design an HACCP flow diagram for different industrial processes,</li> <li>8. State the benefits and limitations of the HACCP</li> <li>9. Highlight the microbial standards for different foods and water</li> </ol>
Teaching and learning	The class will meet for three hours a week. It will be a combination of teachings and practical sessions.
Detailed course content	Microbiological Laboratory and Safe Practices; Good laboratory practices - Good laboratory and microbiological practices, Biosafety cabinets, specification for BSL-1, BSL-2, BSL-3. Discarding biohazardous waste – Methodology of Disinfection, Autoclaving & Incineration. Determining Microbes in Food / Pharmaceutical Samples: Culture and microscopic methods,

	Biochemical and immunological methods, Molecular methods. Isolation of Pathogenic Microorganisms of Importance in Food & Water. HACCP for Food Safety and Microbial Standards Principles, flow diagrams, limitations, Microbial Standards for Different Foods and Water
Course content sequencing	
Weeks	
Week 1	Microbiological Laboratory and Safe Practices; Good laboratory practices - Good laboratory and microbiological practices,
Week 2 & 3	Biosafety cabinets, specification for BSL-1, BSL-2, BSL-3. Continous Assessment I
Week 4 & 5	Discarding biohazardous waste – Methodology of Disinfection, Autoclaving & Incineration.
Week 6, 7 & 8	Determining Microbes in Food / Pharmaceutical Samples: Culture and microscopic methods, Biochemical and immunological methods, Molecular methods. Practical I Continous Assessment II
Week 9	Isolation of Pathogenic Microorganisms of Importance in Food & Water. Practical II
Week 10 & 11	HACCP for Food Safety and Microbial Standards Principles, flow diagrams, limitations, Microbial Standards for Different Important archaeal
Week 12	Revision
Recommended reading material	
<ol style="list-style-type: none"> <li>1. Bibek Ray and Arun Bhunia (2014). FUNDAMENTAL FOOD MICROBIOLOGY Fifth edition CRC Press Taylor &amp; Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL 33487-2742</li> <li>2. Joanne Willey and Kathleen Sandman and Dorothy Wood (2020). Prescott's Microbiology, 11<sup>th</sup> Edition</li> <li>3. Jennifer C. Stearns, PhD, Michael G. Surette, PhD, and Julienne C. Kaiser, MSc Microbiology For Dummies® Published by: John Wiley &amp; Sons, Inc., 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com Copyright © 2019 by John Wiley &amp; Sons, Inc., Hoboken, New Jersey</li> <li>4. Stuart Hogg (2013). Essential Microbiology, 2nd Edition. Wiley-Blackwell, <i>University of Glamorgan, UK.</i></li> </ol>	

- |  |
|--|
| <p>5. James M. Jay ; Martin J. Loessner, David A. (2005). Golden, Modern Food Microbiology. Springer Science+Business Media New York</p> |
|--|

Course code: MCB 309

Course title: ANALYTICAL MICROBIOLOGY

Preamble: This course will focus on ensuring that every laboratory activity is done with best practices to achieve quality outcome. The quality of microbial products is hinged on the environment, conditions of processing, packaging and storage. In microbiology, most products are expected to be sterile till it gets to the consumer. To achieve this, there are some principles and benchmarks that have been highlighted by appropriate authorities. They are widely accepted all over the world and a breach of those guidelines can lead to rejection of products due to the non-sterility and poor quality.

Specific course objectives/learning outcomes.

The course will enable the understanding of the following:

1. Safe and good practices in the Microbiological laboratory
2. Definition of Biosafety cabinet b. types and specification for each type of biosafety cabinet
3. Several ways of discarding biohazardous waste such as Disinfection, Autoclaving & Incineration.
4. The practices involved in determining Microbes in Food and Pharmaceutical Samples as in culture and microscopic methods, Biochemical and immunological methods, Molecular methods.
5. The ways to isolate pathogenic Microorganisms of Importance in Food & Water.
6. Safety principles termed HACCP for Food Safety and Microbial Standards Principles, flow diagrams, benefits and limitations
7. The microbial standards for different foods and water

Learning activities/Course delivery methods

1. Lectures: detailed content of course are taught in class
2. Laboratory Sessions: hands-on practical of the course content will be demonstrated in the laboratory

Course content: Microbiological Laboratory and Safe Practices; Good laboratory practices - Good laboratory and microbiological practices, Biosafety cabinets, specification for BSL-1, BSL-2, BSL-3, Discarding biohazardous waste – Methodology of Disinfection, Autoclaving & Incineration. Determining Microbes in Food / Pharmaceutical Samples: Culture and microscopic methods, Biochemical and immunological methods, Molecular methods. Isolation of Pathogenic

Microorganisms of Importance in Food & Water. HACCP for Food Safety and Microbial Standards Principles, flow diagrams, limitations, Microbial Standards for Different Foods and Water