

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

|                                  |   |         |
|----------------------------------|---|---------|
| Faculty                          | Computing and applied science   |         |
| Department                       | Biological Sciences   |         |
| Course title                     | <b>PHARMACEUTICAL MICROBIOLOGY</b>  |         |
| Year of study                    | 4   |         |
| Course code                      | MCB 402   |         |
| Credit hours                     | 3   |         |
| Contact hours                    | 45  |         |
| Mode of delivery                 | CLASSROOM LECTURES AND PRACTICALS   |         |
| Mode of assessment               |   | WEIGHT% |
| Continuous assessment            |   | 30%     |
| Final examination                |   | 70%     |
| Total                            |   | 100%    |
| Course lecturers and Instructors | MRS F.J. OLAITAN-LECTURER   |         |
| Course description               | <p>"Pharmaceutical Microbiology" is a comprehensive course that delves into the intricate relationship between microorganisms and pharmaceutical products. The course introduces fundamental concepts of microbial growth and death, highlighting their significance in the pharmaceutical industry. Students will explore the chemistry of synthetic chemotherapeutic agents and antibiotics, focusing on their production, synthesis, and application in combating microbial infections. Microbiological quality control practices within the pharmaceutical industry will be a central theme of the course. Students will gain insights into the techniques and methodologies used to maintain the safety and efficacy of pharmaceutical products. The course aims to foster a deep understanding of the critical role that microbiology plays in ensuring the quality and integrity of pharmaceutical formulations.</p> |         |
| Course objectives                | <p>This course will cause students to</p> <ol style="list-style-type: none"> <li>1. Understand the principles of microbial growth and death and their significance in the pharmaceutical context.</li> </ol>  |         |

|                         |  |
|-------------------------|--|
|                         | <ol style="list-style-type: none"> <li>2. Comprehend the chemistry, production, and synthesis of synthetic chemotherapeutic agents and antibiotics.</li> <li>3. Analyze the relationship between antimicrobial agents and different microbial groups.</li> <li>4. Describe the mode of action and methods of assay for antibiotics and antiseptics.</li> <li>5. Explore microbial sensitivity, resistance, and their physiological implications.</li> <li>6. Recognize the impact of microbial spoilage on pharmaceutical products and methods of preservation.</li> <li>7. Evaluate the role of microbiological quality control in the pharmaceutical industry.</li> </ol>  |
| Learning outcomes       | <p>At the end of the course, students will be able to</p> <ol style="list-style-type: none"> <li>1. Describe the process of microbial growth and death and their significance in the pharmaceutical context.</li> <li>2. Describe relevant structure activity relationship and production of synthetic chemotherapeutic agents and antibiotics.</li> <li>3. Associate antimicrobial agents with their respective microbial groups.</li> <li>4. Describe the mode of action and methods of assay for antibiotics and antiseptics.</li> <li>5. Explain the concept of microbial sensitivity and resistance.</li> <li>6. Establish the impact of microbial spoilage on pharmaceutical products and methods of preservation.</li> <li>7. Evaluate the role of microbiological quality control in the pharmaceutical industry.</li> </ol> |
| Teaching and learning   | The class will be taught for three hours a week.   |
| Detailed course content | <p>Concepts of growth and death in micro-organisms. The chemistry of synthetic chemotherapeutic agents and antibiotics. Production and synthesis of antibiotics and antiseptics. Relationship of antimicrobial agents to different microbial groups: Gram positives, Gram negatives, spore-formers, fungi etc. The mode of action and assay of antibiotics and antiseptics. Sensitivity and resistance as related to microbial physiology.</p>   |

|   |   |
|---|---|
|   | Microbial spoilage and preservation of pharmaceutical products, Microbiological quality control in the pharmaceutical industry. |
|   |   |
| Course content sequencing   |   |
| Weeks   |   |
| Week 1  | Microbial Growth and Death in Pharmaceutical Context  |
| Week 2 & 3  | Chemistry of Synthetic Chemotherapeutic Agents and Antibiotics  |
| Week 4  | Production and Synthesis of Antibiotics and Antiseptics   |
| Week 5 & 6  | Antimicrobial Agents and Their Interaction with Microbial Groups  |
| Week 7 & 8  | Mode of Action and Assay of Antibiotics and Antiseptics   |
| Week 9  | Microbial Sensitivity, Resistance, and Physiological Implications   |
| Week 10   | Microbial Spoilage and Preservation of Pharmaceutical Products  |
| Week 11   | Microbiological Quality Control in the Pharmaceutical Industry  |
| Week 12   | Revision  |
| <b>Recommended reading material</b>   |   |
| <ol style="list-style-type: none"> <li>1. Joanne Willey and Kathleen Sandman and Dorothy Wood (2020). Prescott's Microbiology. 11<sup>th</sup> Edition.</li> <li>2. Denyer, Stephen P.; Hodges, Norman; Gorman, Sean P.; Gilmore, Brendan F. (2011). Hugo and Russell's <i>Pharmaceutical Microbiology</i> Hoboken, NJ: Wiley-Blackwell, 2011</li> <li>3. Ashutosh Kar (2020). Essentials of Pharmaceutical Microbiology 2nd Edition. New Age International (P) Ltd Publishers ; Edition, 2nd Edition.</li> </ol> |   |

Course code: MCB 402

Course title: MEDICAL MICROBIOLOGY

Preamble: "Pharmaceutical Microbiology" is a comprehensive course that delves into the intricate relationship between microorganisms and pharmaceutical products. The course introduces fundamental concepts of microbial growth and death, highlighting their significance in the pharmaceutical industry. Students will explore the chemistry of synthetic chemotherapeutic agents and antibiotics, focusing on their production, synthesis, and application in combating microbial infections. Microbiological quality control practices within the pharmaceutical industry will be a central theme of the course. Students will gain insights into the techniques and methodologies used to maintain the safety and efficacy of pharmaceutical products. The course aims to foster a deep understanding of the critical role that microbiology plays in ensuring the quality and integrity of pharmaceutical formulations.

#### **A. Specific course objectives/learning outcomes.**

The course will enable the understanding of the following:

1. Understand the principles of microbial growth and death and their significance in the pharmaceutical context.
2. Comprehend the chemistry, production, and synthesis of synthetic chemotherapeutic agents and antibiotics.
3. Analyze the relationship between antimicrobial agents and different microbial groups.
4. Describe the mode of action and methods of assay for antibiotics and antiseptics.
5. Explore microbial sensitivity, resistance, and their physiological implications.
6. Recognize the impact of microbial spoilage on pharmaceutical products and methods of preservation.
7. Evaluate the role of microbiological quality control in the pharmaceutical industry.

#### **B. Learning activities/Course delivery methods**

#### **C. Lectures: detailed content of course are taught in class**

**Course content:** Concepts of growth and death in micro-organisms. The chemistry of synthetic chemotherapeutic agents and antibiotics. Production and synthesis of antibiotics and antiseptics. Relationship of antimicrobial agents to different microbial groups: Gram positives, Gram negatives, spore-formers, fungi etc. The mode of action and assay of antibiotics and antiseptics. Sensitivity and resistance as related to microbial physiology. Microbial spoilage and preservation of pharmaceutical products, Microbiological quality control in the pharmaceutical industry.

