**Course Description**

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| **Faculty** | **Pharmacy** | | | | | | |
| **Department** |  | | | **Level** | | | 7 |
| **Course** | Pharmaceutical microbiology and biotechnology | **Code** | 1701402 | **Prerequisite** | | | 1702355 |
| **Credit hours** | 2 | **Theoretical** |  | **Practical** | | | NON |
| **Coordinator** |  | **Email** |  | | | | |
| **Teachers** | Dr. Yasser Gaber | **Emails** |  | | | | |
| **Lecture Time** |  | **Place** |  | | **Attendance mode** | Face to face | |
| **Semester** |  | **Preparation date** |  | | **Modification Date** |  | |

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| **Abstracted Course Description** |
| This course aims and intend to provide pharmacy students with detailed knowledge and skills in microbiological quality of pharmaceuticals including sterilization methods and evaluation of sterility together with criteria for aseptic area. Additionally, the course content includes lectures about non-antibiotic agents such as disinfectants, antiseptics, preservatives), their origin, their classification, mechanisms of action and mechanisms of microbial resistance, their use related to microbial infections and the methods of their evaluations. The course will include introduction to the basics of recombinant DNA technology, PCR, DNA isolation and purification and DNA sequencing |
| **Course Goals** |
| 1.Understanding Microbiological Quality Concepts and Methods for Pharmaceutical Preparations: Providing knowledge about the principles and methods used to assess and maintain microbiological quality in pharmaceutical products.  2.Familiarity with Antibiotic and Non-Antibiotic Agents, Mechanisms of Action, and Resistance: Learning about various antibiotic and non-antibiotic agents, comprehending their modes of action against microorganisms, and understanding the development of resistance by microorganisms against these agents.  3.Knowledge of Sterilization Methods and Selection Process: Gaining an understanding of different sterilization methods available in pharmaceutical settings and the ability to select appropriate sterilization processes based on specific articles or materials. |

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| **CILOs** | | | | | |
| **Knowledge** | | | | | |
| 1. Describe the quality control and quality assurance 2. Know the importance of sterilization in food, pharmaceutical industry and in medicine 3. Know the mechanism of killing in heat sterilization and its applications. | | | | | |
| **Skills** | | | | | |
| 1. . Criticize the suitable method of sterilization for different pharmaceutical preparations 2. Design the sterility test for different pharmaceutical preparations and articles 3. Design antibiotic sensitivity tests for microorganisms and evaluation of antimicrobial agents | | | | | |
| **Competencies** | | | | | |
| 1. Calculate the D-value for certain sterilization method against defined microorganism 2. Sketch the suitable method of sterilization in pharmaceutical industry and calculation of Sterility Assurance Level 3. Give a presentation about the mechanism of resistance in antibiotics | | | | | |
| **Learning Methods** | | | | | |
| * Lectures * Oral discussion * Assignments | | | | | |
| **Evaluation Tools** | | | | | |
| **Exams**  **quiz** | | | | | |
| **Week** | Lecture | **Learning methods** | **Evaluation tool** | **ILOs** | **Hours** |
| **1.** | Microbial quality, microbiological quality control and assurance, GMP, GLP, TQA, sterility test and pyrogen test | Textbook and handouts | QUIZ | **A 3** | **2** |
| **2.** | Physical methods of microbial control, kinetics of microbial death, D-Value and Z-Value | **A 2** | **2** |
| **3.** | Sterilization – Heat and steam sterilization, types of autoclaves | Textbook and handouts | Exam | **B 1** | **2** |
| **4.** | Sterilization – Cold Sterilization methods, Gas sterilization and radiation | Textbook and handouts | Exam | **B 1** | **2** |
| **5.** | Validation of sterilization processes | **A 3** | **2** |
| **6.** | Evaluation of antiseptics, disinfectants and preservatives I | Textbook and handouts | Exam | **A 1** | **2** |
| **7.** | Basics of DNA biochemistry | Textbook and handouts | Exam | **A 2** | **2** |
| **8.** | Genetics : basics , operons , eukaryotic and prokaryotic genetic organization , DNA replication | Textbook and handouts | **B 1** | **2** |
| **9.** | Restriction enzymes and its application | Textbook and handouts | Exam | **C 2** | **2** |
| **10.** | PCR technique, Sanger sequencing, Second generation sequencing | Textbook and handouts | **C 3** | **2** |
| **11.** | Techniques used to DNA isolation and detection (southern blot , agarose gel electrophoresis) | Textbook and handouts | Assignments | **A 3** | **2** |
| **12.** | Mechansims of Antibiotic resistance | Textbook and handouts | **B 2** | **2** |
|  | Mechansims of Antibiotic resistance | Textbook and handouts |  | **B1** | **2** |
| **13.** | Revision | Textbook and handouts | Exam | **A 1** | **2** |
| **14.** | Final Examinations |  |  | **2** |

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| |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Plan of Course Evaluation** | | | | | | | | | | | | | **Evaluation Tools** | | **Mark** | **ILOs** | | | | | | | | | | **A1** | **A2** | **A3** | **B1** | **B2** | **B3** | **C1** | **C2** | **C3** | | **First Exam (Mid-term)** | | **30%** | \* | \* | \* |  |  |  |  |  |  | | **Second Exam (If available)** | |  |  |  |  |  |  |  |  |  |  | | **Final Exam** | | **50%** |  |  | \* | \* | \* |  |  |  |  | | **Activities** | | **20%** |  | | | | | | | | | | **Activities Evaluation** | Homework/Tasks | 10% |  |  |  | \* | \* |  |  |  |  | | Case Study |  |  |  |  |  |  |  |  |  |  | | Discussion and Interactions |  |  |  |  |  |  |  |  |  |  | | Group Activities |  |  |  |  |  |  |  |  |  |  | | Laboratory Exams |  |  |  |  |  |  |  |  |  |  | | Presentations |  |  |  |  |  |  |  |  |  |  | | Quizzes | 10% |  | \* | \* | \* |  |  |  |  |  | | Others |  |  |  |  |  |  |  |  |  |  | | **Total** | | 100% |  |  |  |  |  |  |  |  |  |   **Components** | |
| **Book** | Hugo WB; Russell AD. Pharmaceutical Microbiology 7th edition. 2004. Blackwell Scientific Publications, Oxford |
| **References** | Hugo WB; Russell AD. Pharmaceutical Microbiology 7th edition. 2004. Blackwell Scientific Publications, Oxford |
| **Recommended Readings** |  |
| **Electronic materials** |  |
| **Other websites** |  |

**Subject Coordinator:**

**Head of Curriculum Committee:**

**Department Head:**

**Faculty Dean:**

**Last update date:**