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**Salahaddin University- Erbil**

**College of Agricultural engineering &sciences**

**Department of food technology**

**COURSE BOOK**

**Dairy microbiology (Practical)**

**Third year student**

**First semester-academic year 2021-2022**

**Course Book**

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| Course title | Microbiology(practical) |
| Lecturer in charge |  |
| Dept/ College | Agricultural engineering &sciences  | Food technology  |
| Contact details | Tel:  | Email: chnar.hadi@su.edu.krd  |
| Course link in the University |  |
| Coordinator’s name | Chnar Suliman (Practically Lecture) |
| Contact details | Tel: 07504731180  | Email: chnar.hadi@su.edu.krd |
| **Course Content:** Identify the instruments and tools used in microbiology laboratory, microscope parts and it's function ,types of sterilization and importance of sterilization, composition and classification of culture ,staining and preparation of smear ,simple staining , gram staining , acid fast staining, capsule staining, endospore stainingMethods for isolating bacteria, antimicrobial susceptibility test , study characteristics of *Streptococci sp.* ,*Staphylococci sp.* and *Escherichia coli* |
| **Course Objectives:** By taking this course and at the end of this course ,students will be able to:1-Know parts of the light microscope and the function of each part.2-Understanding principles and methods of sterilization relative to general microbiology.3-Preparing a bacterial smear from a culture grown in broth and a culture grown in broth.4- Know the differences between simple staining and differential staining.5-The students be able to prepare culture medium and culturing microorganisms, know the terms that used to describe characteristics of culture and using streaking technique.  |
|  Course Reading List and References‌ |
| Main references | Useful references | Magazines and review (Internet) |
| **-Cowan M.K and Talaro K.P(2006).**Microbiology a systems Approach.McGraw-Hill. | **Burton E.P and Michael J.L(1999).**Exercises for the Microbiology Laboratory.Morton Publishing CompanyUnited States of America | Indian journal of microbiology |
| **-Kinaka Sharma (2008).**Manual of Microciology Tools& Techniques.Second Edition.Ane Books India. | **Talaro K.and T.Arthur(1996).**Foundation in Microbiology Basic principles.Time Mirror Higher Education Group,Inc. | <http://www.microbiology-journal.com> |
| **-Prescott L.M.,,Harley J.P.and Klein D.A.(2005).** Microbiology 6th ed.WCB/McGraw-Hill. |  | http://www. e-journal.org/.microbiology/ |

**Syllabus**

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| **No.** | **Title of the Subject** | **Lecturer's name**  |
|  **Week 1**  | Coarse book & Lab safety  | Chnar Sulaiman |
| **Week 2** | Control of microorganisms &Chemical methods | Chnar Sulaiman |
| **Week 3** | Bacterial cultural characteristics | Chnar Sulaiman |
| **Week 4** | Microscope parts &simple staining | Chnar Sulaiman |
| **Week 5** | Exam | Chnar Sulaiman |
| **Week** 6 | Bacterial stainingGram staining | Chnar Sulaiman |
| **Week** 7 | Acid fast staining | Chnar Sulaiman |
| **Week** 8 | Culture media&Streak plate method | Chnar Sulaiman |
| **Week** 9 | Exam | Chnar Sulaiman |

**Note**

All lectures are explained by power point, animation and video, also white board will be used for explanation.

Students are required to conduct two exams in fall semester in the practical microbiology part. The mean of two exams will be out of (10)marks and (5)marks for activity for practical part ,with general total (15)marks.

The final exam will be out of (20)marks.

Pattern of questions and answers :

***Q1/ Define the staining and enumerate types of staining techniques****. (15 marks)*

***Q2/Answer the following question:***

***A/Classification types of media According to* Composition (enumerate only four)*.***

***B****/***Write two major pathogens mycobacteria.** *(20 marks)*

***Q3/*Match the Column A *with* Column Bchosen correct phrase:** *(25 marks)*

|  |  |
| --- | --- |
| **Column A** | **Column B** |
| **1-Fungicide**  | **a-Ozone** |
| **2-Heavy metals**  | **b-65oC for 30 minutes** |
| **3-Oxidizing agents**  | **c-contains gelatin and agar 1-5%** |
| **4-Heat** | **d-Physical Methods** |
| **5-Solid media**  | **e-له ناوبردنى مايكروب**  |
| **6-Basic Dyes** | **f-An agent that kills fungi** |
| **7-Crystal Violet** | **g- Waxy cell walls** |
| **8-acid- fast stain** | **h-chromophore is the positive ion dye.** |
| **9-Disinfiction** | **i-Gram stain** |
| **10- Pasteurization** | **j-silver , mercury and copper** |

 **(Answer)1**

**Q1/procedure that applies colored chemicals called dyes to the specimen in order to facilitate identification.1-Simple staining( morphological shape & arrangement)**

 **2-Differential staining (acid faststain,gram stain, spore and capsule stain)**

**Q2/A-Simple media, enriched media, selective ,differential ,biochemical reaction.**

1. **B/*Mycobacterium tuberculosis*)**
2. ***Mycobacterium leprae* (**

**Q3/ 1-f , 2-j, 3-a, 4-d, 5-c, 6-h, 7-I, 8-g, 9-e , 10-b**