

Lead City University, Ibadan
Faculty of Basic Medical and Applied Sciences
Department of Microbiology
Second Semester Examination. 2017/2018 Academic Session

COURSE PARTICULARS

COURSE TITLE: Basic Technique in Microbiology

COURSE CODE: MCB 212

COURSE TITLE: BIOLOGICAL TECHNIQUES

COURSE CODE: MCB 202, BIO 211 and BIO 215

LECTURER DETAILS

NAME: Prof. Allan Femi Lana

Qualifications: B. Sc, M. Sc and Ph. D

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Area of Specialization: Nematology and Virology

NAME: O.A. Akintobi

Qualifications: B.Sc, M.Sc (Microbiology), Ife.

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Area of Specialization: Microbial Physiology and Metabolism, Mycology and Medicinal Plants.

NAME: Mr. Michael Oluwole

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Area of Specialization; Laboratory Technologist(Microbiology Option)

COURSE DESCRIPTION

The course covers ; microscope and its application, microscope slides and culture media preparation, methods for studying microorganisms (Culturing and Isolation), Biological drawings, characterizations and identification of microorganisms, plants and animals, colorimetry, cytometry, microtomy , chromatography, centrifugation, herbarium , experimental design, reports preparation and data interpretation.

COURSE OBJECTIVES

This course:-

- Serves as a concise guide for the conduct of practical in microbiology and biology laboratories
- Will allow students to easily carry out basic experiments in most aspects of microbiological and biological techniques
- Will enable students to familiarize themselves with various equipment in the microbiology laboratory.

INTRODUCTION

Microbiological and Biological Techniques, a practical aspects of Microbiology and Biology courses, that are constantly demanding modifications and improved standard as more as information on the subject is continuously added to the practical knowledge. Hence, the course provides a wide variety of fundamental practical exposure that will help to equip students for their project work and their future endeavor in Microbiology and Biology.

TEACHING PLAN

By Prof. Allan Femi Lana , and Mr. M.E. Oluwole

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| Week 1 | Experimental design and laboratory safety rules |
| Week 2 | Data collection and analysis |
| Week 3 | Practical report preparation and checklist for good diagram |

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| Week 4 | Microscope and Microscopy |
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- Week 5 Practicals on the use of microscope and slide preparation
- Week 6 Sterilization and culture media preparation
- Week 7-9 Methods of studying Microorganisms:
 Characterization, isolation, staining and identification of microorganisms
- Week 10 Practical on sterilization, culturing , staining and isolation techniques
- Week 11 Botanical drawings, microtomy and preservation technique
- Week12 Biochemical tests e.g. Catalase, oxidase, MRVP, Indole, Coagulase, haemolysis, Citrate
- Week 13-14 Colorimetry, spectrophotometry, chromatography, Electrophoresis, Microtomy, Centrifugation (Hematocrit, Table Top, Ultra Cold Centrifuge), Membrane Filtration / Vacuum pump
- Week 15 Revision

Assessment

- Routine Weekly assessment = 20 marks/ %
 - Course work and attendance = 20 marks %
 - End of semester practical examination = 60 marks
- Total = 100 marks/ %

READING LIST

- Cappuccino, G.J and Sherman, N. (2010). Microbiology, a Laboratory Manual . Ninth Edition Benjamin Cummings Publisher for Pearson. ISBN : 13; 978-0-32167387-9 ISBN 10, 0-321-67387-51301, Sansome, San Francisco, USA.
- Smith, K.C. and Katz, D (1997). An Electronic Competition to Microbiology Majors. Cogito Learning Media, Inc. USA ISBN; 1-888902-58-2
- Harrigan, W.F and Mccane, M.E (1986). Laboratory Methods in Food and Dairy Microbiology. Academic Press London. ISBN; 0-12-326040x
- Satish Guptee Practical Microbiology. 3rd Edition . Jaypee Brothers Medical Publisher ISBN
- Schlegel , H.G. (2002). Genral Microbiology. Low Price Edition. Cambridge. ISBN; 052149850

TUTORIAL QUESTIONS

SECTION A

MCB 212, 202\ BIO211 AND 215 (Compulsory for all students)

- 1 (a) Identify specimens **A, B, C, D** and **E** with reasons
(b) List five precautions to observe when using specimen **B**
- 2 (a) State systematic way of microbiological assessment of water effluent from Lead City University
(b) List the five staining techniques you have done
- 3 Compare and contrast the properties of bacteriological agar with that of gelatin as solidifying agents
- 4 What do you understand by the following microbiological terms: (a) Broth culture (b) Differential staining technique (c) Microscopy (d) Pathogenicity (e) Aerosol

SECTION B

MCB 212 Students (Answer any 2 questions)

- 5 (a) Gram stain an inoculum from specimen **F** provided
Draw and state the Gram reaction you observe under oil- immersion objective of the compound microscope
(b) What is Gram variable? Give an example
- 6 List the names of the coliform bacteria you know. Are all the coliforms pathogenic? Explain.
- 7 (a) Define and state the functions of microbial culture media
(b) State five advantages of Gram staining procedure

SECTION C

MCB 202 Students (Answer any 2 questions)

- 8 (a) Carry out the catalase test on Specimen **F** provided and write out the procedure of the test.

- (b) List any 5 reagents\ stains you have used in the laboratory
- 9 What is the full meaning of the following terms: (i) SPSS (ii) M\C\S (iii) FBC
(iv) HACCP (v) FIFO
- 10 (a) what did you understand by the word 'epidemic'?
- (b) State the difference between field and laboratory report
- (c) As an environmental health officer, list 10 basic wears\ wares which you can use to guide yourself while working in an endemic environment.

SECTION D

BIO 211 and 215 Students (Answer any 2 questions)

- 11 (a) Carry out the catalase test on specimen F provided and write out the procedure of the test.
- (b) List any 5 biochemical tests you have done in the laboratory
- 12 (a) What do you understand by the word ' inoculum' and list the various sizes you have used in your experiment?
- (b) List various methods of isolating techniques you have studied. Describe how serial dilution technique is carried out
- 13) Describe a simple test to show that chlorophyll is required for glucose\ carbohydrate production during photosynthesis

MARKING GUIDE FOR MCB 212/BIO 211, BIO 215

SPECIMEN Centrifuge, Colony Counter, Mixed Culture plate of Bacteria, Spectrophotometer, Pure Culture plate of Fungi, Anaerobic Jar, Monocular Microscope, Side -Arm Conical Flask, Autoclave

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| 1. | a. Each correctly identified specimen =1mark | =5marks |
| | b. Precautions observed | =5marks |
| | Total | = 10 marks |
| 2. | a. Correct way of sampling analysis | = 5marks |
| | b. Each correctly listed technique =1 marks | =5marks |
| | Total | = 10marks |
| 3. | a. Every Correct comparison = 1 mark | Total = 10 marks |
| 4. | Correct Definition =2marks | Total = 10marks |
| 5. | a. Correctly prepared slide = 3marks, each labelled part = 1 mark = 7marks | |
| | b. Correct Definition = 1 mark Example =2 marks | =3marks |
| | Total | = 10marks |
| 6. | a. Correct definition, example and discussion = 2marks each | Total = 10marks |
| 7. | (a) Correct explanation | = 5marks |
| | (b) Each correct advantage | = 5 marks |
| | Total | = 10 marks |
| 8. | a. Correctly prepared slide = 3marks, each labelled part = 1 mark = 5marks | |
| | b. Every correctly listed reagents = 1 mark | =5marks |
| | Total | = 10marks |
| 9. | Correct definition = 2 marks | Total = 10 marks |
| 10. | (a) Definition | =2 marks |
| | (b) Each difference = 2 marks | = 4marks |
| | (c) Every listed ware/apparatus = ½ mark | Total = 10 marks |
| 11. | a. Correctly prepared slide = 3marks, each labelled part = 1 mark = 5marks | |
| | b. Every correctly listed reagents = 1 mark | =5marks |
| | Total | = 10marks |
| 12. | (a) Definition of inoculum and example | = 5 marks |
| | (b)Every correctly listed technique= ½ mark, explanation = 3 marks | |
| | Total | = 10 marks |
| 13. | Correct description | Total = 10 marks |