



Output of the Workshop on the Harmonization of Syllabi of Microbiology Courses in the Philippines

30 August 2018, Chancellor's Hall, University of the Philippines Los Baños

HARMONIZED SYLLABUS/OUTLINE FOR GENERAL/BASIC MICROBIOLOGY

Course Outline:

LECTURE

- I.** History and Scope of Microbiology
- II.** Taxonomy
 - A. Taxonomy vs. Systematics
 - B. Components of Taxonomy
 - i. Classification
 - ii. Identification
 - iii. Nomenclature
- III.** Classification of microorganisms
- IV.** Microbial Diversity / Survey of the Microbial World
 - A. Cellular- Three Domains
 - i. Archaea
 - ii. Bacteria
 - iii. Eukarya
 - a. Fungi
 - b. Protists
 - B. Acellular
 - i. Viruses
 - ii. Viroids
 - iii. Prions
- V.** Anatomy of cellular microorganisms
 - A. Archaea, Bacteria
 - B. Fungi
 - C. Algae
 - D. Protozoans

- VI. Microbial growth requirements**
 - A. Microbial nutrition
 - B. Physical factors affecting growth
 - C. Growth and reproduction
- VII. Microbial metabolism**
 - A. Aerobic metabolism
 - B. Anaerobic metabolism
 - i. Anaerobic respiration
 - ii. Fermentation
 - C. Photosynthesis
- VIII. Microbial genetics**
 - A. Structures of DNA, RNA, Proteins
 - B. Central Dogma
 - C. Genetic variation
 - i. Mutation
 - ii. Genetic recombination
 - iii. Modes of gene transfer
 - D. Epigenetic factors
 - E. Applications in biotechnology
- IX. Acellular infectious agents**
 - A. Viruses
 - B. Viroids
 - C. Prions
- X. Biosafety and biosecurity**
- XI. Control and destruction of microorganisms**
 - A. Physical agents
 - B. Chemical agents
 - i. Disinfectants, antiseptics sterilizing agents
 - ii. Chemotherapeutic agents
- XII. Microbial Applications in Environmental Science**
 - A. Role in Geochemical Cycles
 - B. Role in Biodegradation of Solid Wastes, Liquid Wastes
- XIII. Microbial Applications in Industry**

LABORATORY

- I. Microscopy**
- II. Aseptic Techniques**
 - A. Study of microorganisms from the environment

- i. Normal body flora
 - ii. Common items
- III. Culture Media
 - A. Preparation/ Sterilization
- IV. Microscopic Examination of Microorganisms
 - A. Wet mount, hanging drop
 - B. Staining techniques
 - i. Gram Stain
 - ii. Special Stains
 - a. Spore stain, capsule stain, flagellar stain
- V. Factors Affecting Microbial Growth
 - A. Temperature
 - B. pH
 - C. O₂
 - D. Desiccation
 - E. Media components
- VI. Antimicrobial Susceptibility Testing
- VII. Food and Water Bacteriology
- VIII. Fermentation
 - A. Wine making
 - B. Yoghurt production
 - C. Kimchi or sauerkraut production

SUGGESTED REFERENCES (PARTIAL LIST)

MADIGAN, MT, BENDER, KS, BUCKLEY, DH, SATTLEY, WM and STAHL, DA. 2021. Brock Biology of Microorganisms. 16th ed. USA: Pearson Education Limited. 1120 p.

TORTORA, GJ, FUNKE, BR and CASE, CL . 2019. Microbiology : An Introduction. 13th edition. USA : Pearson Education, Inc. 960 p.

BLACK, JG and BLACK, LJ. 2018. Microbiology: Principles and Explorations. 10th edition. USA : Wiley. 896 p.

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<http://textbookofbacteriology.net/>

www.asm.org: links to MicrobeLibrary, scientific journals, Microbe Magazine, atlas, podcast etc.(of the American Society for Microbiology)

www.microbiologyonline.org.uk (of the Society of General Microbiology)