

OKALOOSA-WALTON COMMUNITY COLLEGE
COURSE SYLLABUS – Part 1 Course Data

Lab Fee NSW4

Other _____

Req'd Opt A Opt B
By _____

Course Number MCB 2010C New (Add) Update Textbook Revision Only Deletion (Inactive) Reactivate

Course Title Microbiology, Allied Health

Div/Dept Code NSCI SBAH Subject Code BIO Effective Term 20021 End Term _____

Course/Credit Type (Check One only)	Contact/Credit Hours	ICS Code	11104
<input checked="" type="checkbox"/> 01 A & P	Lecture Hours <u>45</u>	Grading	<input checked="" type="checkbox"/> A-F <input type="checkbox"/> P/F <input checked="" type="checkbox"/> Audit OK
<input type="checkbox"/> 02 PSV (AS only)	Lab Hours <u>30</u>		
<input type="checkbox"/> 02 PSV Dual (Transfer)	Clinical Hours _____		
<input type="checkbox"/> 05 PSAV	Other _____	CEU Approved	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input type="checkbox"/> 03 College Prep	Clock Hours _____	Number of enrollment times for credit	<u>1</u>
<input type="checkbox"/> 07 ABE/ESL			
<input type="checkbox"/> 09 GED			
<input type="checkbox"/> 08 Adult Secondary	Total Credits <u>4</u>		
<input type="checkbox"/> 10 Voc Prep			

Course Catalog Description: This course is designed for students entering programs in the numerous health fields, but primarily for pre-nursing students. The material presented covers the fundamentals of microbiology needed to understand the biology of infectious diseases and the agents that cause them

Prerequisites CHM1020 or CHM 1045C or BSC1005 or BSC1010C or BSC1085C

Corequisites None

General Education No Yes, AA and AS Yes, AS Only Area _____

Gordon Rule No Yes, Word Count _____

Scheduling Fall Spring Summer All As needed

Special Equipment/Facilities Oil immersion microscopes, autoclave, incubators, sterilizing oven, hot water bathes, phase contrast microscope, Quebec colony counter.

Recommended Text/Software: Microbiology Fundamentals A Clinical Approach, 2nd ed., Marjorie Kelly Cowan, McGraw Hill ISBN #978-0-07-340235-2

Required in these Programs AS Nursing (per AS to BS Articulation)

Elective in these Programs Any AA, AS, AAS degree program

Replaces or is equivalent to another course No Yes If so, course number _____

Special Designators PA, PD

Prepared By Dr. Roger Adams Date 3/25/05

Director/Chair Approval Darryl Ritter/Jon Bryan Date 3/25/05

Curriculum Committee Action Approved Disapproved Postponed Date N/A for TBR

Vice President for Instruction See attached adoption form Date _____

President _____ N/ A for text book revision Date _____

Course Dictionary Update by _____ Date _____

White: VP Instruction Yellow: Business Office Pink: Registrar

COURSE SYLLABUS — PART II
COURSE GOALS

Course Number MCB2010C Title Microbiology, Allied Health

Prepared by Dr. Roger Adams Date 3/25/05

Director/Chair Darry Ritter/Jon Bryan Date 3/25/05

Criteria: (1) Direction oriented; (2) student oriented — written in terms of what students will accomplish; (3) provide the lay reader with an understanding of the substance of the course; and (4) the number of statements should be sufficient to clearly identify the mission of the course.

Goal Number	Statement
1.	The student shall learn basic microbiological principles such as organization, structure, and function of cells, microbial physiology, microbial genetics, microbial growth, classification schemes, control of microorganisms, and basic introduction to the study of viruses.
2.	The student shall learn about microorganisms that coexist with humans. They will become aware of how microorganisms live in a state of cohabitation with the healthy human body until a state of disease develops.
3.	The students shall learn about the immune system and its role in providing resistance.
4.	The student shall study procaryotic pathogens, that is, the study of bacteria, rickettsiae, and chlamydiae which are causative agents of diseases in humans.
5.	The students shall learn about subcellular infectious agents (viruses) of human infections.
6.	The student shall learn about human infections produced by eukaryotic pathogens (fungi and protozoans).
7.	The student shall learn aseptic techniques, sterilization, disinfection and antimicrobial therapy.
8.	The student shall develop laboratory techniques for cultivation, study and control of microbes.

COURSE SYLLABUS — PART III
PERFORMANCE OBJECTIVES

Course Number MCB2010C

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Date 3/25/05

Prepared by Dr. Roger Adams

Course Title Microbiology, Allied Health

Director/Chair Ritter/Bryan

A specific objective is one in which the outcome and the level of achievement are defined in measurable terms.

Object No.	Related Goals	Objective Statement	Evaluation
		The Student Shall:	
1.	1	Describe the scope of microbiology, noting especially the variety of microbes and the kinds of work that microbiologists do.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
2.	1	Identify two reasons for studying microbiology and explain why each is important.	
3.	1	Summarize the early history of microbiology, noting especially the development of the microscope.	
4.	1	State the germ theory of disease and summarize the historical developments that led to its formulation.	
5.	1	Cite major events in the development of immunology, virology, chemotherapy, microbial genetics, and molecular biology.	
6.	1	Explain why knowledge of basic chemistry is necessary to understand microbiology.	

Object No.	Related Goals	Objective Statement	Evaluation
7.	1	Define the terms <i>atom</i> , <i>element</i> , <i>molecule</i> , and <i>compound</i> ; list the most common elements (and their symbols) found in living organisms.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
8.	1	Describe the structure of an atom, noting especially the characteristics of protons, neutrons, and electrons; explain the formation and structure of ions and isotopes.	
9.	1	Provide several distinguishing characteristics for ionic, covalent, and hydrogen bonds, and show how they are involved in holding atoms together.	
10.	1	List and describe the characteristics of chemical reactions.	
11.	1	List and describe at least four properties of water that are important to its function in living systems.	
12.	1	Describe the properties of solutions and colloidal dispersions that are important to their function in living systems.	
13.	1	Define the terms <i>acid</i> , <i>base</i> , and <i>pH</i> ; explain how these terms are used in relationship to living systems.	
14.	1	Define organic chemistry and identify the four major functional groups of organic molecules.	
15.	1	Describe the general structure and chemical properties of carbohydrates, and explain the role of carbohydrates in living systems.	
16.	1	List and describe the characteristics of the	

Object No.	Related Goals	Objective Statement	Evaluation
17.	1	<p>three main types of carbohydrates, and provide two examples of each.</p> <p>Describe the general structure and chemical properties of simple lipids, compound lipids, and steroids, and explain the role of each in living systems.</p>	<p>Students will score a minimum of 60% on a written examination to measure the cognitive domain.</p>
18.	1	<p>Describe the general structure and chemical properties of amino acids, and note how amino acids form into proteins.</p>	
19.	1	<p>Describe the four levels of structure found in proteins; contrast structural proteins and enzymes.</p>	
20.	1	<p>Describe the general structure and chemical properties of nucleotides, and explain the role of nucleotides in living systems.</p>	
21.	1	<p>Contrast the characteristics, chemistry, and roles of the two nucleic acids, DNA and RNA..</p>	
22.	1	<p>Describe briefly the evolution of microscopic instruments and their relationship to the progress made in microbiology.</p>	
23.	1	<p>List the appropriate metric units that are used to measure bacteria, viruses, fungi, protozoa, and helminthes.</p>	
24.	1	<p>Contrast the differences and relationships among the following:</p> <ul style="list-style-type: none"> wavelength resolution numerical aperture 	

Object No.	Related Goals	Objective Statement	Evaluation
25.	1	<p>Discuss the relationship of microbiology to the following properties of light:</p> <ul style="list-style-type: none"> Transmission Absorption Fluorescence Luminescence Phosphorescence Reflection Refraction Diffraction 	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
26.	1	Locate and describe the function of each major part of a compound light microscope.	
27.	1	List and describe the special adaptations of bright-field, dark-field, phase-contrast, differential interference contrast, and fluorescence (UV) microscopy.	
28.	1	Briefly explain the principles of transmission, scanning tunneling, and scanning electron microscopy, noting especially how each differs from light microscopy.	
29.	1	Compare the advantages and limitations of electron microscopy with those of light microscopy.	
30.	1	List and describe the techniques used to prepare and heighten contrast in specimens to be viewed with a light microscope.	
31.	1	Define the term <i>stain</i> ; list and describe the	

Object No.	Related Goals	Objective Statement	Evaluation
		features and purpose of at least four common types of stains used in microbiology.	
32.	1	List the steps in the Gram stain and explain each of their functions and results.	
33.	1	Contrast the characteristics of eukaryotic and prokaryotic cell types.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
34.	1	Describe the sizes, shapes, and arrangements of prokaryotic cells, especially as they relate to bacterial cells.	
35.	1	Describe the basic structure and function of the cell membrane and cell wall of bacterial cells.	
36.	1	List and describe the structure and function of internal cell components of bacteria, including endospores.	
37.	1	Describe the structure and function of the external cell components of bacteria.	
38.	1	Describe the general structure of eukaryotic cells, noting especially the importance and location of their membranes.	
39.	1	List and describe the structure and function of the internal components of eukaryotic cells.	
40.	1	Describe the structure and function of the external components of eukaryotic cells.	
41.	1	Explain the endosymbiotic theory and give examples of organelles that may have evolved by endosymbiosis.	

Object No.	Related Goals	Objective Statement	Evaluation
42.	1	Describe the following passive processes, and explain their importance in cell function: Simple diffusion Facilitated diffusion Osmosis	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
43.	1	Describe the process of active transport, explaining how it differs from passive processes and why it is important in cell function.	
44.	1	Describe the processes of exocytosis and endocytosis, and explain their importance in eukaryotic cell function.	
45.	1	Define the following terms: Metabolism Autotrophy Heterotrophy Oxidation Reduction Photoautotrophy Photoheterotrophy Chemoautotrophy Chemoheterotrophy Glycolysis Fermentation Aerobic metabolism Biosynthetic processes	
46.	1	List and describe the characteristics of enzymes and explain how these characteristics contribute to enzymatic function.	
47.	1	List and describe the characteristics of a	

Object No.	Related Goals	Objective Statement	Evaluation
		coenzyme, noting especially its relationship to an enzyme.	
48.	1	List the basic steps of the glycolysis pathway, noting especially the location of energy production, the role of coenzymes, and the significance of pyruvic acid.	
49.	1	List several important characteristics of fermentation.	
50.	1	Describe the Krebs cycle, and explain its significance in energy capture.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
51.	1	Describe the electron transport chain, noting especially the processes of oxidative phosphorylation and chemiosmosis and their significance in energy capture.	
52.	1	Contrast the metabolic processes of fermentation and aerobic metabolism, noting especially the cycles involved, energy production, type of oxidation, and the end products.	
53.	1	Describe how microorganisms metabolize fats and proteins for energy.	
54.	1	Briefly describe the process of photosynthesis, and explain its significance in photo heterotrophic and photoautotrophic microbes.	
55.	1	Contrast the processes of Photoheterotrophy, and Chemoautotrophy.	
56.	1	Describe how the bacteria carry out biosynthetic activities, and relate these activities to their amphibolic pathways.	

Object No.	Related Goals	Objective Statement	Evaluation
57.	1	List and describe several examples of how bacteria use energy for membrane transport and for movement.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
58.	1	Define growth and note how it applies to bacteria.	
59.	1	Describe the process of cell division in bacteria.	
60.	1	List and describe the four phases of growth in a bacterial culture.	
61.	1	List and describe at least four methods used to measure bacterial growth.	
62.	1	List at least six physical factors that affect bacterial growth and explain the effects of each.	
63.	1	List at least seven biochemical factors that affect bacterial growth and explain the effects of each.	
64.	1	Describe the processes of sporulation and germination; note the importance of bacterial endospores.	
65.	1	List and describe three methods to pure culture an organism in the laboratory.	
66.	1	List several types of culture media and explain how each type provides the nutritional requirements for microbial growth.	
67.	1	List and describe three types of special media used in selecting, differentiating and /or enriching for certain bacteria.	

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68.	1	Briefly describe how genes, chromosomes, and mutations are involved in heredity in prokaryotic organisms.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
69.	1	Explain how nucleic acids function in the storage and transfer of information.	
70.	1	Summarize the steps in DNA replication in prokaryotic cells.	
71.	1	List and describe the major steps involved in protein synthesis, from DNA to the completed protein molecule.	
72.	1	List and describe the function and location of the three types of RNA involved in protein synthesis.	
73.	1	Explain the significance of mechanisms that regulate metabolism, and distinguish between mechanisms that regulate enzyme activity and mechanisms that regulate gene expression.	
74.	1	Describe the processes and effects of feedback inhibition.	
75.	1	Describe the processes and effects of enzyme induction and enzyme repression.	
76.	1	Define the term <i>mutation</i> ; list several types of mutations and what effect they have on the cell.	
77.	1	Contrast spontaneous mutations with induced mutations.	
78.	1	Describe the fluctuations test, replica plating,	

Object No.	Related Goals	Objective Statement	Evaluation
		and the Ames test and note how they can be used in studying prokaryotic mutations.	
79.	1	Briefly describe the nature of gene transfer and explain its significance.	
80.	1	Describe the discovery, mechanism, and significance of transformation.	
81.	1	Describe the discovery and mechanisms of generalized and specialized transduction and explain the significance of transduction.	
82.	1	Describe the discovery, mechanisms, and significance of conjugation.	
83.	1	Describe the characteristics of plasmids and explain the actions of resistance plasmids and bacteriocinogens.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
84.	1	Define genetic engineering and briefly describe the nature and applications of the following techniques: Genetic fusion Protoplast fusion Gene amplication Recombinant DNA Hybridomas	
85.	1	List several important concerns of scientists regarding the use of recombinant DNA.	
86.	1	Discuss how and why microorganisms are named.	
87.	1	Describe the contributions of Linnaeus to taxonomy.	

Object No.	Related Goals	Objective Statement	Evaluation
88.	1	Describe how a dichotomous taxonomic key is used to identify organisms.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
89.	1	List and describe two major problems in creating a taxonomic system; note several important taxonomic developments since Linnaeus's time.	
90.	1	List at least four major characteristics for each of the five kingdoms in the current system of taxonomy.	
91.	1	Provide rationale for the need of the Three-Domain Classification system.	
92.	1	List and describe the characteristics currently used in classifying viruses.	
93.	1, 5	Provide several reasons why special methods are needed to determine evolutionary relationships among prokaryotes; list the major methods currently used.	
94.	1, 5	Describe the general characteristics, structural components, shapes sizes, specificity, and host ranges of viruses.	
95.	1, 5	Explain how viruses are classified; list and describe the major characteristics of each group of viruses.	
96.	1, 5	List and describe the five steps of virion replication.	
97.	1, 5	Contrast the mechanisms of replication in virulent and temperate phages.	

Object No.	Related Goals	Objective Statement	Evaluation
98.	1, 5	List and describe the steps involved in animal virus replication.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
99.	1, 5	List and describe the different types of culture systems currently used to grow animal viruses.	
100.	1, 5	Define the term <i>teratogen</i> , and briefly describe how viruses act as teratogens.	
101.	1, 5	Describe the properties of viroids and prions.	
102.	1, 5	Describe how viruses cause cancer; define the term <i>oncogene</i> .	
103.	1, 6	Define the terms <i>parasite</i> and <i>parasitology</i> and list five principles of parasitism.	
104.	1, 6	List and describe the general characteristics and importance of protists.	
105.	1, 6	Identify the three major groups of protists.	
106.	1, 6	List and describe the general characteristics and importance of fungi.	
107.	1, 6	Identify the five major groups of fungi.	
108.	1, 6	List and describe the general characteristics of parasitic helminthes.	
109.	1, 6	Identify the two major groups of parasitic helminthes.	
110.	1, 6	List and describe the general characteristics of parasitic and vector arthropods.	
111.	1, 6	Identify the three major groups of parasitic and	

Object No.	Related Goals	Objective Statement	Evaluation
		vector arthropods.	
112.	1, 2, 7	Contrast sterilization with disinfection, and define at least six important terms related to these processes.	
113.	1, 2, 7	List three principles that apply to the processes of sterilization and disinfection.	
114.	1, 2, 7	List and describe four factors that affect the potency of antimicrobial chemical agents.	
115.	1, 2, 7	Discuss the problems associated with the evaluation of the effectiveness of disinfectants, and list several methods that are used in evaluation.	
116.	1, 2, 7	List and describe three mechanisms of action of chemical antimicrobial agents.	
117.	1, 2, 7	Briefly describe the properties of 10 commonly used chemical antimicrobial agents.	
118.	1, 2, 7	Describe how dry heat, moist heat, and pasteurization are used to control microorganisms.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
119.	1, 2, 7	Describe how refrigeration, freezing, drying, and freeze-drying are used to control and to preserve microorganisms.	
120.	1, 2, 7	Explain how each of the following are used to control microorganisms: radiation, sonic and ultrasonic waves, filtration, and osmotic pressure.	
121.	1, 2, 7	Define the terms <i>chemotherapy</i> , <i>chemotherapeutic agent</i> , <i>antimicrobial agent</i> ,	

Object No.	Related Goals	Objective Statement	Evaluation
122.	1, 2, 7	<p><i>chemotherapeutic index, antibiosis, antibiotic, synthetic drug, and semisynthetic drug.</i></p> <p>Explain how the first chemotherapeutic agents were developed, and summarize the subsequent events in the development of chemotherapy.</p>	<p>Students will score a minimum of 60% on a written examination to measure the cognitive domain.</p>
123.	1, 2, 7	<p>Explain <i>selective toxicity</i> and <i>spectrum of activity</i>, as these terms are applied to antimicrobial agents.</p>	
124.	1, 2, 7	<p>List and describe five modes of action of antimicrobial agents.</p>	
125.	1, 2, 7	<p>List and describe three significant side effects associated with the use of antimicrobial agents.</p>	
126.	1,2,7	<p>Define <i>resistance</i>, and describe several mechanisms by which microorganisms acquire resistance to antibiotics.</p>	
127.	1, 2, 7	<p>List and describe three important methods used to determine sensitivities of microbes to chemotherapeutic agents.</p>	
128.	1, 2, 7	<p>Identify six attributes of an ideal antimicrobial agent.</p>	
129.	1, 2, 7	<p>List the five modes of action of antibacterial agents, and describe the properties, uses, and side effects of each.</p>	
130.	1, 2, 7	<p>Describe the properties, uses, and side effects of at least five types of antifungal agents; at</p>	

Object No.	Related Goals	Objective Statement	Evaluation
		least five types of antiviral agents; at least four types of antiprotozoan agents; and at least two types of antihelminthic agents.	
131.	1, 2, 7	Explain how resistant hospital infections arise, and decide the problems associated with their treatment and prevention.	
132.	1, 2, 4, 7	Define the terms <i>host</i> , <i>symbiosis</i> , <i>commensalisms</i> , <i>mutualism</i> , <i>parasitism</i> , <i>contamination</i> , <i>infection</i> , <i>disease</i> , <i>pathogen</i> , <i>pathogenicity</i> , <i>virulence</i> , <i>attenuation</i> , <i>normal microflora</i> , <i>resident microflora</i> , <i>transient microflora</i> , and <i>opportunist</i> .	
133.	1, 2, 4, 7	List and describe Koch's postulates and relate them to infectious disease.	
134.	1, 2, 4, 7	Distinguish between infectious and noninfectious diseases; communicable and noncommunicable infectious diseases.	
135.	1, 2, 4, 7	List and describe at least five different mechanisms by which microbes cause disease.	
136.	1, 2, 4, 7	Define <i>sign</i> , <i>symptom</i> , <i>syndrome</i> , and terms used to describe types of diseases.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
137.	1,2,4,7	List and describe five steps in the course of an infectious disease.	
138.	1, 2, 4, 7	Define <i>epidemiology</i> , and list and describe several terms that are used by epidemiologists.	
139.	1, 2, 4, 7	Classify the four disease categories according to their spread in populations.	

Object No.	Related Goals	Objective Statement	Evaluation
140.	1, 2, 4, 7	List the purpose and methods used in epidemiological studies.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
141.	1, 2, 4, 7	List three types of reservoirs of infection, and describe how each contributes to human disease.	
142.	1, 2, 4, 7	Describe the roles of portal of entry and exit, and list and describe several modes of transmission in the spread of human disease.	
143.	1, 2, 4, 7	Describe an infectious disease cycle, noting especially how herd immunity is related to the cycle.	
144.	1, 2, 4, 7	List and describe four methods used to control communicable diseases.	
145.	1, 2, 4, 7	Provide several examples illustrating how the functions of public health organizations and the reporting of notifiable diseases contribute to public health.	
146.	1, 2, 4, 7	Define nosocomial infections, and describe how they are studied epidemiologically.	
147.	1, 2, 4, 7	Describe several methods used in the prevention and control of nosocomial infections.	
148.	1, 2, 3	Describe how nonspecific and specific host defenses differ.	
149.	1, 2, 3	List and describe the physical barrier defenses.	

Object No.	Related Goals	Objective Statement	Evaluation
150.	1, 2, 3	List the cells that form the cellular barrier defenses, and describe their characteristics.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
151.	1, 2, 3	List and define the stages in the process of phagocytosis, and describe several kinds of cells that are involved.	
152.	1, 2, 3	List and describe the important structures and functions of the lymphatic system.	
153.	1, 2, 3	What is inflammation, and what are its four characteristics.	
154.	1, 2, 3	List and describe the functions of the major steps in the acute inflammatory process.	
155.	1, 2, 3	Contrast the causes and effects of chronic inflammation.	
156.	1, 2, 3	Describe how fever functions as a nonspecific defense.	
157.	1, 2, 3	Describe how interferon functions in nonspecific defenses.	
158.	1, 2, 3	Describe how complement functions as a molecular defense mechanism.	
159.	1, 2, 3	Describe the acute phase response.	
160.	1, 2, 3	Define <i>immunology</i> , and describe how immunity differs from susceptibility.	
161.	1, 2, 3	Differentiate among innate immunity, acquired immunity, and active and passive immunity.	
162.	1, 2, 3	List the properties of antigens and antibodies.	

Object No.	Related Goals	Objective Statement	Evaluation
163.	1, 2, 3	Describe how cells and tissues function in the dual roles in the immune system.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
164.	1, 2, 3	Describe how recognition of self, specificity, heterogeneity, and immunological memory function in the immune system.	
165.	1, 2, 3	Describe how B cells and antibodies function in humoral immunity.	
166.	1, 2, 3	Describe how primary and secondary responses confer immunological memory and immunity to infectious diseases.	
167.	1, 2, 3	Describe how cell-mediated immunity differs from humoral immunity, noting how cell-mediated immune reactions occur.	
168.	1, 2, 3	List six important factors that can modify the immune response.	
169.	1, 2, 3	Describe the mechanisms of immunization and recommended immunizations; note the benefits and hazards of immunization.	
170.	1, 2, 3	Define the term <i>hypersensitivity</i> , and list the four different types.	
171.	1, 2, 3	Describe the causes, mechanism, and effects of immediate (Type I) hypersensitivity.	
172.	1, 2, 3	Describe the causes, mechanism, and effects of cytotoxic (Type II) reactions.	
173.	1, 2, 3	Describe the causes, mechanism, and effects of immune complex (Type III) disorders.	

Object No.	Related Goals	Objective Statement	Evaluation
174.	1, 2, 3	Describe the causes, mechanism, and effects of cell-mediated (Type IV) reactions.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
175.	1, 2, 3	Describe how autoimmune disorders arise and how hypersensitivity is related to it.	
176.	1, 2, 3	Discuss how and why organ transplants are sometimes rejected, and describe how this rejection can be prevented.	
177.	1, 2, 3,	Describe how hypersensitivity is involved in drug reactions.	
178.	1, 2, 3,	Identify the causes, mechanisms, and effects of immunodeficiency diseases.	
179.	1, 2, 3,	Describe how antigens and antibodies can be detected and measured in fluid, cells, and tissues.	
180.	1, 2, 3,	Identify the epidemiology, origins, treatment, and social perspectives of AIDS.	
181.	1, 2, 3, 4, 5, 6, 7	List the components of the skin and eyes, and name some of the microorganisms considered to be normal microflora.	
182.	1, 2, 3, 4, 5, 6, 7	List the most important pathogens that cause skin diseases.	
183.	1, 2, 3, 4, 5, 6, 7	Describe the important epidemiological and clinical aspects of these skin diseases.	
184.	1, 2, 3, 4, 5, 6, 7	List the most important pathogens that cause eye infections.	

Object No.	Related Goals	Objective Statement	Evaluation
185.	1, 2, 3, 4, 5, 6, 7	Describe the important epidemiological and clinical aspects of these eye infections.	
186.	1, 2, 3, 4, 5, 6, 7	List the kinds of pathogens that infect wounds and bites.	
187.	1, 2, 3, 4, 5, 6, 7	Describe the important epidemiological and clinical aspects of these wound and bite infections.	
188.	1, 2, 3, 4, 5, 6, 7	List the components of the male and female urogenital system and the normal microflora found there.	
189.	1, 2, 3, 4, 5, 6, 7	List the important bacteria that cause urogenital diseases not usually sexually transmitted, and describe the important epidemiological and clinical aspects of these diseases.	
190.	1, 2, 3, 4, 5, 6, 7	List the important parasites that cause urogenital diseases not usually sexually transmitted, and describe the important epidemiological and clinical aspects of these diseases.	
191.	1, 2, 3, 4, 5, 6, 7	List the bacteria that cause sexually transmitted urogenital diseases, and describe the important epidemiological and clinical aspects of these diseases.	
192.	1, 2, 3,	List the viruses that cause sexually transmitted	Students will score a minimum of 60%

Object No.	Related Goals	Objective Statement	Evaluation
	4, 5, 6, 7	urogenital diseases, and describe the important epidemiological and clinical aspects of these diseases.	on a written examination to measure the cognitive domain.
193.	1, 2, 3, 4, 5, 6, 7	List the components of the respiratory system and the normal microflora found there.	
194.	1, 2, 3, 4, 5, 6, 7	List the important bacteria that cause upper respiratory infections, and describe the important epidemiologic and clinical aspects of the disease they cause.	
195.	1, 2, 3, 4, 5, 6, 7	List the important viruses that cause upper respiratory infections, and describe the important epidemiologic and clinical aspects of the diseases they cause.	
196.	1, 2, 3, 4, 5, 6, 7	List the important bacteria that cause lower respiratory infections, and describe the important epidemiologic and clinical aspects of the diseases they cause.	
197.	1, 2, 3, 4, 5, 6, 7	List the important viruses that cause lower respiratory infections, and describe the important epidemiologic and clinical aspects of the diseases they cause.	
198.	1, 2, 3, 4, 5, 6, 7	List the important fungi that cause lower respiratory infections, and describe important epidemiologic and clinical aspects of the diseases they cause.	
199.	1, 2, 3, 4, 5, 6, 7	List the important parasites that cause respiratory infections, and describe the important epidemiologic and clinical aspects of the diseases they cause.	

Object No.	Related Goals	Objective Statement	Evaluation
200.	1, 2, 3, 4, 5, 6, 7	List the components of the digestive system and the normal microflora found there.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
201.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause diseases of the oral cavity, and describe the important epidemiologic and clinical aspects of these diseases.	
202.	1, 2, 3, 4, 5, 6, 7	List the important bacteria that cause gastrointestinal diseases, and describe the important epidemiologic and clinical aspects of these diseases.	
203.	1, 2, 3, 4, 5, 6, 7	List the important viruses that cause gastrointestinal diseases, and describe the important epidemiologic and clinical aspects of these diseases.	
204.	1, 2, 3, 4, 5, 6, 7	List the important protozoa that cause gastrointestinal diseases, and describe the important epidemiologic and clinical aspects of these diseases.	
205.	1, 2, 3, 4, 5, 6, 7	List the important fungi that cause gastrointestinal diseases, and describe the important epidemiologic and clinical aspects of these diseases.	
206.	1, 2, 3, 4, 5, 6, 7	List the important helminthes that cause gastrointestinal diseases, and describe the important epidemiologic and clinical aspects of these diseases.	
207.	1, 2, 3, 4, 5, 6,	List the components of the cardiovascular and lymphatic systems and their normal microflora.	

Object No.	Related Goals	Objective Statement	Evaluation
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208.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause bacterial septicemias and related diseases, and describe the important epidemiological and clinical aspects of these diseases.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
209.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause parasitic diseases of the blood and lymph, and describe the important epidemiological and clinical aspects of these diseases.	
210.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause bacterial systemic diseases, and describe the important epidemiological and clinical aspects of these diseases.	
211.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause rickettsial systemic diseases, and describe the important epidemiological and clinical aspects of these diseases.	
212.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause viral systemic diseases, and describe the important epidemiological and clinical aspects of these diseases.	
213.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause parasitic systemic diseases, and describe the important epidemiological and clinical aspects of these diseases.	
214.	1, 2, 3, 4, 5, 6, 7	List the components of the nervous system and the normal microflora found there.	

Object No.	Related Goals	Objective Statement	Evaluation
215.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause bacterial diseases of the brain and meninges, and describe the important epidemiological and clinical aspects of these diseases.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
216.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause viral diseases of the brain and meninges, and describe the important epidemiological and clinical aspects of these diseases.	
217.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause bacterial nerve diseases, and describe the important epidemiological and clinical aspects of these diseases.	
218.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause viral nerve diseases, and describe the important epidemiological and clinical aspects of these diseases.	
219.	1, 2, 3, 4, 5, 6, 7	List the important pathogens that cause parasitic diseases of the nervous system, and describe the important epidemiological and clinical aspects of these diseases.	
220.	1, 2, 3, 4, 5, 6	Define ecology, and describe how energy flows in ecosystems.	
221.	1, 2, 3, 4, 5, 6	Describe the importance of recycling, and note how water and carbon are recycled.	
222.	1, 2, 3, 4, 5, 6	List and describe three other major biogeochemical cycles, and indicate what roles microorganisms play in them.	
223.	1, 2, 3, 4, 5, 6	Describe the kinds of microorganisms found in air, and indicate how they are detected and	

Object No.	Related Goals	Objective Statement	Evaluation
		controlled.	
224.	1, 2, 3, 4, 5, 6	List and describe several kinds of microorganisms found in soil, and indicate their roles in biogeochemical cycles and as potential pathogens.	
225.	1, 2, 3, 4, 5, 6	Describe how microorganisms found in freshwater and marine environments differ.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
226.	1, 2, 3, 4, 5, 6	Describe how water pollution and waterborne pathogens affect humans.	
227.	1, 2, 3, 4, 5, 6	Describe how water is purified and how it is tested to determine purity.	
228.	1, 2, 3, 4, 5, 6,	Describe the term <i>sewage</i> , and list the processes involved in primary, secondary, and tertiary sewage treatment.	
229.	1, 2, 4, 5, 6, 7	Describe the kinds of microorganisms that can be found in grains, fruits and vegetables, meats, poultry, fish, seafoods, milk, sugars, syrups, and other liquids.	
230.	1, 2, 4, 5, 6, 7	Discuss how diseases are transmitted in foods.	
231.	1, 2, 4 5, 6, 7	Describe how food spoilage and disease transmission can be prevented, and list the standards that relate to these problems.	
232.	1, 2, 4, 5, 6, 7	Describe how microorganisms can be used as food and used in the making of food products.	
233.	1, 2, 4, 5, 6,7	Describe how microbes are used in the manufacture of beer, wines, and spirits.	

Object No.	Related Goals	Objective Statement	Evaluation
234.	1, 2, 4, 5, 6, 7	Describe how microbes are used in industry, and list several problems associated with their use.	Students will score a minimum of 60% on a written examination to measure the cognitive domain.
235.	1, 2, 4, 5, 6, 7	Briefly discuss the role that microbes play in the manufacture of simple organic compounds, antibiotics, enzymes, and other biologically useful substances.	
236.	1, 2, 4, 5, 6, 7	Describe how microbes are used in mining.	
237.	1, 2, 4, 5, 6, 7	Describe how microbes are used in waste disposal.	
238.	1, 2, 4, 5, 6, 7, 8,	Perform the following stains on bacteria: Gram Acid fast Spore Capsule	
239.	1, 2, 4, 5, 6, 7, 8	Isolate pure cultures.	
240.	1, 2, 4, 5, 6, 7, 8	Measure the number of microbe cell in a solution.	
241.	1, 2, 4, 5, 6, 7, 8	Identify selected unknown organisms.	