WILMINGTON UNIVERSITY
COLLEGE OF ARTS AND SCIENCES
BASIC COURSE INFORMATION

COURSE NUMBER	**BIO 336**
COURSE TITLE	**Microbiology (with Lab)**
CREDITS	**4**
PREREQUISITE	**BIO 251?**
FACULTY MEMBER	
TERM	
METHOD OF CONTACT/ OFFICE HOURS	

COURSE TIME BREAKDOWN

64 Hours of Structured Learning Activities

TEXTBOOKS
*A list of course textbooks are available on the Wilmington University Bookstore website: http://bookstore.wilmu.edu/

COURSE DESCRIPTION

This four-credit lab course explores the unseen life on earth. The diversity of microorganisms, including the basics of cell biology and genetics, are examined. Students will gain a deeper understanding of how microbes shape the environment and their essential role in human life. Controlling microbes under special situations (e.g. food safety, hospitals), how the human body defends against microbial invaders, disease outbreaks, and current efforts to track and control infectious diseases are discussed.

COURSE OBJECTIVES

This course will provide students with the knowledge and skills to:

1. Describe the structure of an atom and its relation to the physical properties of elements.
2. Define ionic bond, covalent bond, hydrogen bond, molecular weight, and mole.
3. Diagram three basic types of chemical reactions.
4. List several properties of water that are important to living systems.
5. Define acid, base, salt, and pH.
6. Distinguish organic and inorganic compounds.
7. Define functional group.
8. Identify the building blocks of carbohydrates.
9. Differentiate simple lipids, complex lipids, and steroids.
10. Identify the building blocks and structure of proteins.
11. List the metric units of measurement that are used for microorganisms.
12. Diagram the path of light through a compound microscope.
13. Define total magnification and resolution.

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55. Define protist.
56. Differentiate eukaryotic, prokaryotic, and viral species.
57.

99. Discuss the relationship between DNA- and RNA-containing viruses and cancer.
100. Provide an example of a latent viral infection.
101. Differentiate persistent viral infections from latent viral infections.
102. Discuss how a protein can be infectious.
103. Differentiate virus, viroid, and prion.
104. Describe the lytic cycle for a plant virus.
105. Define pathology, etiology, infection, and disease.
106. Define normal microbiota and transient microbiota.
107. Compare commensalism, mutualism, and parasitism, and give an example of each.
108. Contrast normal microbiota and transient microbiota with opportunistic microorganisms.
109.
110. Differentiate a communicable from a noncommunicable disease.
111. Categorize diseases according to frequency of occurrence.
112. Categorize diseases according to severity.
113. Define herd immunity.
114. Identify four predisposing factors for disease.
115. Put the following in proper sequence according to the pattern of disease: period of decline, period of convalescence, period of illness, prodromal period, incubation period.
116. Define reservoir of infection.
117. Contrast human, animal, and nonliving reservoirs, and give one example of each.
118. Explain three methods of disease transmission.
119. Define healthcare-associated infections and explain their importance.
120. Define compromised host.
121. List several methods of disease transmission in hospitals.
122. Explain how healthcare-associated infections can be prevented.
123. List several probable reasons for emerging infectious diseases, and name one example for each reason.
124. Define epidemiology, and describe three types of epidemiologic investigations.
125. Identify the function of the CDC.
126. Identify the principal portals of entry.
127. Define ID50 and LD50.
128. Using examples, explain how microbes adhere to host cells.
129. Explain how capsules and cell wall components contribute to pathogenicity.
130. Compare the effects of coagulases, kinases, hyaluronidase, and collagenase.
131. Provide an example of direct damage, and compare this to toxin production.
132. Contrast the nature and effects of exotoxins and endotoxins.
133. Using examples, describe the roles of plasmids and lysogeny in pathogenicity.
134. Discuss the causes of symptoms in fungal, protozoan, helminthic, and algal diseases.
135. Differentiate portal of entry and portal of exit.
136. Define hypersensitivity.
137. Describe the mechanism of anaphylaxis.
138. Define desensitization and blocking antibody.
139. Describe the mechanism of cytotoxic reactions and how drugs can induce them.
140. Describe the basis of the ABO and Rh blood group systems.
141. Describe the mechanism of immune complex reactions.
142. Give an example of immune complex, cytotoxic, and cell-mediated autoimmune diseases.
143. Define HLA complex, and explain its importance in disease susceptibility and tissue transplants.
144. Define privileged site.
145. Discuss the role of stem cells in transplantation.

182. List the signs and symptoms of sepsis, and explain the importance of infections that develop into septic shock.
183. Differentiate gram-negative sepsis, gram-positive sepsis, and puerperal sepsis.
184. Describe the epidemiologies of diseases discussed.
185. List pathogens that are transmitted by animal bites and scratches.
186. Compare and contrast the causative agents, vectors, reservoirs, symptoms, treatments, and preventive measures for plague, Lyme disease, and Rocky Mountain spotted fever.
187. Discuss the worldwide effects of these diseases on human health.
188. Diagram the life cycle of Schistosoma, and show where the cycle can be interrupted to prevent human disease.
189. Recognize the clinical features of Kawasaki syndrome.
190. Describe how microorganisms are prevented from entering the respiratory system.
191. Characterize the normal microbiota of the upper and lower respiratory systems.
192. Differentiate pharyngitis, laryngitis, tonsillitis, sinusitis, and epiglottitis.
193. List the causative agent, symptoms, prevention, preferred treatment, and laboratory identification tests for diseases discussed.
194. List the causative agent, mode of transmission, preferred treatment, and laboratory identification tests for four fungal diseases of the respiratory system.
195. Name the structures of the digestive system that contact food.
196. Identify parts of the gastrointestinal tract that normally have microbiota.
197. Describe the events that lead to dental caries and periodontal disease.
198. List the causative agents, suspect foods, signs and symptoms, and treatments for staphylococcal food poisoning, shigellosis, salmonellosis, typhoid fever, cholera, gastroenteritis, and peptic ulcer disease.
199. List the causative agents, modes of transmission, sites of infection, and symptoms for diseases discussed.
200. List the causative agents, modes of transmission, symptoms, and treatments for giardiasis, cryptosporidiosis, Cyclospora diarrheal infection, and amebic dysentery.
201. List the causative agents, modes of transmission, symptoms, and treatments for tapeworms, hydatid disease, pinworms, hookworms, whipworms, ascariasis, and trichinellosis.
202. List the antimicrobial features of the urinary system.
203. Identify the portals of entry for microbes into the female and male reproductive systems.
204. Describe the normal microbiota of the upper urinary tract, the male urethra, and the female urethra and vagina.
205. Describe the modes of transmission for urinary and reproductive system infections.
206. List the microorganisms that cause cystitis, pyelonephritis, and leptospirosis, and name the prediETQe causative agent, mode ofns and symp5nn11(sa)7(t)-4(i)-4(v)11p0 g0 G[pr)-3(ed)9(i)-4(ETQe)9(ca)-2(u)11(

216. Explain pre and post-transcriptional regulation of gene expression in bacteria.
217. Classify mutations by type.
218. Identify the purpose of and outline the procedure for the Ames test.
219. Differentiate horizontal and vertical gene transfer.
220. Compare the mechanisms of genetic recombination in bacteria.
221. Describe the functions of plasmids and transposons.
222. Discuss how genetic mutation and recombination provide material for natural selection to act upon.
223. Compare and contrast biotechnology, genetic modification, and recombinant DNA technology.
224. Identify the roles of a clone and a vector in making recombinant DNA.
225. Define restriction enzymes, and outline how they are used to make recombinant DNA.
226. List the four properties of vectors.
227. Outline the steps in PCR, and provide an example of its use.
228. Describe five ways of getting DNA into a cell.
229. Explain how each of the following is used to locate a clone: antibiotic-resistance genes, DNA probes, gene products.

260. Compare and contrast food preservation by industrial food canning, aseptic packaging, radiation, and high pressure.
261. Name four beneficial activities of microorganisms.
262. Define industrial fermentation and bioreactor.
263. Differentiate primary from secondary metabolites.
264. Describe the role of microorganisms in the production of industrial chemicals and pharmaceuticals.
265. Define bioconversion, and list its advantages.
266. List biofuels that can be made by microorganisms.

Labs Requirements:

For face to face courses only: Safety goggles and nitrile gloves will be provided by Wilmington University. Students are required to wear a lab coat for all lab work. All persons in the lab are required to wear closed toed, non-perforated shoes and personal protective equipment-4(he 9.96 Tf1 0 0 1 202.46 65.424 Tm0 g0 G)7(