MASTER COURSE OUTLINE

A. BIOL 1060 Microbes and Society

B. COURSE DESCRIPTION:

This course is primarily intended for non-science majors. The major, organizing themes of the course are centered upon learning the basic concepts and theories of biology, with major emphasis placed on gaining an understanding of the microbial world, and how microbes impact humans and their environment. Topics of study will include a survey of microorganisms, an examination of the human microbiome, the microbial role in industry, food production and biotechnology, bioterrorism and the local and global threat of infectious disease.
MnTC (Goals 3/NS and 10 PE); (3 Cr – 2 lect, 1 lab)

C. *Core Theme: People and the Environment **MnTC Discipline: Natural Sciences

D. RIVERLAND INSTITUTIONAL LEARNING OUTCOMES:

This course addresses the following Riverland Institutional Learning Outcome(s):
☐ ILO 1: critical thinking *(Core Theme Goal 2)*
☐ ILO 2: awareness of the larger global community *(Core Theme Goal 7 or 8)*
☒ ILO 3: ethical, engaged citizenship *(Core Theme Goal 9 or Goal 10)*
☐ ILO 4: communication and collaboration *(Discipline Goal 1 and by any learning outcome(s) involving communication or collaboration)*

E. MAJOR CONTENT AREAS:

Part I: The Microbial World
- The microbial world: surprising and stunning
- Microbes in perspective
- Molecules of the cell
- DNA: genes and genomics
- Bacteria: a survey
- Viruses: a survey
- Protists: a survey
- Fungi and yeasts
- Growth and metabolism
- Microbial genetics
- Controlling microbes

Part II: Microbes and Human Affairs

- Microbes and food
- Food preservation and safety
- Biotechnology and industry
- Microbes and agriculture
- Microbes and the environment
- Disease and resistance
- Viral diseases of humans
- Bacterial diseases of humans

F. GOAL TYPES, OBJECTIVES, AND OUTCOMES:

GOAL	**OBJECTIVES** **Students will be able to**	**OUTCOMES** **The student will successfully**
MnTC Goal 3a	demonstrate understanding of scientific theories.	1. complete an analysis of lab experimental findings, a journal article, and/or a case study that will include identifying the independent, dependent, and control variables as well as the steps of the scientific method. 2. complete the written assignments and the exam questions in the course related to basic concepts in biology.
MnTC Goal 3c	communicate their experimental findings, analyses and interpretations both orally and in writing.	1. complete an analysis (such as in 3a above) that will be developed in a discussion-based setting (or oral communication) and submitted as a written, graded assignment.
MnTC Goal 3d	evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.	1. identify the primary global health issue in a case study, journal article, experimental finding or similar tool; develop an evidence-supported opinion on the issue, and characterize this opinion from the standpoint of differing societal perspectives.
MnTC Goal 10a	explain the basic structure and function of various natural ecosystems and of human adaptive strategies within those systems.	1. complete a written project that details the role microbes play in a variety of ecosystems: freshwater, marine, soil, and how humans have had an impact, either positively or negatively, on each of these environments.
MnTC Goal 10b	discern patterns and interrelationships of bio-physical and socio-cultural systems.	1. incorporate into the written project in 10a, above, a description of the microbial organisms found in each of the physical environments explained above and how an imbalance can lead to human disease. 2. the student will investigate, compare and contrast life in a developed country as compared to an underdeveloped country placing an emphasis on access to safe food, clean water and health care while considering cultural, political and economic barriers.

MnTC Goal 10e	propose and assess alternative solutions to environmental problems.	1. through lab experimentation, written assignments and/or discussions, the student will propose and assess alternative solutions to environmental problems due to human activity. (These problems may include sewage treatment and the prevention of water-borne epidemics, oil spills and bioremediation, mining and treatment of contaminated water, soil, and agricultural disruption of chemical cycling, antibiotic use in humans and farm animals and the development of antibiotic resistance.)
MnTC Goal 10f	articulate and defend the actions they would take on various environmental issues.	1. through lab experimentation, written assignments and/or discussions students will be asked to read about a current issue related to environmental microbiology (i.e., antibiotics found in river and lake water) and articulate and defend the action they would take to provide a solution to the problem.
CS	explain the diversity of the microbial world.	1. using a microscope, identify, compare and contrast the structures, reproductive methods and functions of bacteria, viruses, prions, protozoa, helminths, fungi and yeasts.
CS	explain the roles of microbes in the environment and industry.	1. isolate and identify microbes that reside and play essential roles in biochemical cycling, bioremediation, food production, pharmaceutical industry, biotechnology.
CS	describe the association of microbes with human health.	1. isolate and identify microbes that constitute normal microbiota and those that cause disease in humans.

G. SPECIAL INFORMATION:

This course may require use of the Internet, the submission of electronically prepared documents and the use of a course management software program. Students who have a disability and need accommodations should contact Accessibility Services at the beginning of the semester. This information will be made available in alternative format, such as Braille, large print, or cassette tape, upon request.

H. COURSE CODING INFORMATION:

Course Code C, B/Class Maximum 48, 24; Letter Grade

Revision Date: 11/30/15; 01/31/18; 09/06/22; 01/09/24
AASC Approval Date: 03/06/18; 09/20/22; 02/20/24

*These five MnTC Goals have been identified as Riverland Community College Core Themes. Every course in the Riverland Community College curriculum shall meet outcomes from one of these themes.
**These five MnTC Goals have been identified as Riverland Community College Disciplines. Riverland's MnTC courses also shall meet outcomes from a Discipline Area.

NOTE: The Minnesota Transfer Curriculum "10 Goal Areas of Emphasis" are reflected in the five required discipline areas and five core themes noted in the Riverland Community College program of study guide and/or college catalog.

***Riverland Community College Core Themes**	**MnTC Goal Number**
Critical Thinking (CT)	**2**
Human Diversity (HD)	**7**
Global Perspective (GP)	**8**
Ethical and Civic Responsibility (EC)	**9**
People and the Environment (PE)	**10**

****Riverland Community College Discipline Areas**	**MnTC Goal Number**
Communication (CM)	**1**
Natural Sciences (NS)	**3**
Mathematics/Logical Reasoning (MA)	**4**
History and the Social & Behavioral Sciences (SS)	**5**
Humanities and Fine Arts (HU)	**6**