MASTER COURSE OUTLINE

A. BIOL 2300 Genetics

B. COURSE DESCRIPTION:

This course presents the fundamental concepts of classical transmission genetics and modern molecular genetics. Topics include cell reproduction, Mendelian genetics, linkage and recombination, chromosomal variations, molecular genetics, biotechnology and population and evolutionary genetics. Prerequisite: BIOL 1091
MnTC (Goal 3/NS and Goal 2/CT); (4 Cr – 3 lect, 1 lab)

C. *Core Theme: Critical Thinking **Discipline Area (if MnTC): 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:

- Cell reproduction
- Mendelian genetics
- Linkage and recombination
- Chromosome variations
- Molecular genetics
- Biotechnology
- Population and evolutionary genetics

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F. GOAL TYPES, OBJECTIVES, AND OUTCOMES:

GOAL TYPE	OBJECTIVES Students will be able to	OUTCOMES The student will successfully
MnTC Goal 2a	gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive and conscious of possible bias in the information selected.	1. complete an analysis of scientific findings relevant to genetics. 2. summarize the findings, an explanation of the context of the findings, and of the sources of possible bias in the analysis above.
MnTC Goal 2b	imagine and seek out a variety of possible goals, assumption, interpretations or perspectives which can give alternative meanings or solutions to a given situation or problem.	1. determine and justify hypothesis/hypotheses prior to experimentation. 2. present data to support or contradict hypothesis/hypotheses after concluding experimentation.
MnTC Goal 2c	analyze the logical connections among the facts, goals and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.	1. predict and discuss expected results prior to experimentation. 2. explain how assumptions affect interpretation of the results.
MnTC Goal 3a	demonstrate understanding of scientific theories.	1. complete an analysis of an experiment related to genetics that will include identifying the independent, dependent, and control variables as well as the steps of the scientific method. 2. define and explain the principles of experimentally-verifiable biological theories, including cell theory, the theory of evolution, and other theories relevant to genetics. 3. define and explain the pertinent vocabulary terms related to outcomes 1 and 2 above.
MnTC Goal 3b	formulate and test hypotheses by performing laboratory simulations or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.	1. choose and perform an in-depth analysis of the use of the scientific method in a researched study of genetics including statistical and graphical analysis. 2. explain the sources of possible bias, error and uncertainty in the experimental analysis above.

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MnTC Goal 3c	communicate their experimental findings, analyses and interpretations both orally and in writing.	1. document the use of the experimental method, types and uses of data collection, statistical and graphical analysis, in the study chosen in MnTC Goal 3b. 2. communicate the findings in oral and written formats.
CS	apply statistical analysis to genetics appropriately.	1. define and explain the application of statistics related to genetics and be able to solve one, two and three factor crosses.
CS	understand how alleles and genes interact.	1. explain how genes interact to produce phenotype.
CS	understand the molecular process of genetics.	1. explain transcription and translation related to DNA replication and protein synthesis.
CS	demonstrate an understanding of DNA analysis.	1. explain nucleic acid analysis and gene cloning.
CS	understand population genetics and its role in evolution.	1. define and explain the effect of population genetics on evolutionary processes.

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 current media, upon request.

H. COURSE CODING INFORMATION:

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

Revision date: 02/01/18; 09/06/22; 03/05/24
AASC Approval date: 05/08/18; 09/20/22; 03/19/24

*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.

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*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**

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