



MASTER COURSE OUTLINE

A. BIOL 1050 Introduction to Forensic Science

B. COURSE DESCRIPTION:

This introductory course will apply the principles and theories of biology and chemistry to the study of forensic science. The student will be introduced to crime scene investigation and evidence collection. Topics explored will include forensic toxicology, pathology, anthropology, impressions, blood, serology, DNA profiling and the examination of other physical and chemical evidence.

MnTC (Goal 3/NS and Goal 2/CT); (3 Cr – 2 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:

- The Crime Scene
- Evidence collection
- Forensic toxicology (alcohol and drugs)
- Types of chromatography
- Microscopy
- Fibers and paint
- Glass and soil
- Hair
- Forensic anthropology and pathology
- Forensic serology (blood typing, blood spatter, miscellaneous body fluids)
- DNA evidence
- Fingerprints and other impressions
- Firearms and tool marks
- Document examination

F. GOAL TYPE, OBJECTIVES, AND OUTCOMES:

<u>GOAL TYPE</u>	<u>OBJECTIVES</u> Students will be able to	<u>OUTCOMES</u> The student will successfully
<u>MnTC Goal 3a</u>	demonstrate understanding of scientific theories.	1. demonstrate understanding of scientific theories related to the scientific method, cell chemistry, cell biology, DNA, and the principles of science as applied in the area of forensic biology and chemistry. 2. complete an analysis of an experiment that includes identifying the independent, dependent, and control variables as well as the steps of the scientific method.
<u>MnTC Goal 3b</u>	formulate and test hypotheses by performing laboratory, simulation, 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. participate in and demonstrate an understanding of laboratory and field exercise related to the areas of chemical, physical, and biological evidence analysis. 2. demonstrate an understanding of data collections techniques, statistical and graphical analysis of data and develop an appreciation for the sources of error and uncertainty inherent in any scientific inquiry.
<u>MnTC Goal 3c</u>	communicate their experimental findings, analyses, and interpretations both orally and in writing.	1. discuss experimental findings in oral and written formats.
<u>MnTC Goal 3d</u>	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. demonstrate the ability to evaluate societal issues related to forensic science from a natural science perspective. 2. answer critical analysis questions regarding physical and forensic evidence. 3. make and communicate informed judgments about forensic science topics and related policies.
<u>MnTC Goal 2a</u>	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. apply forensic science information to given situations, such as the analysis of forensic evidence in solving crimes. 2. demonstrate the possible sources of bias in that information and analyze subsequent decision-making options.
<u>MnTC Goal 2b</u>	imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives which can give alternative meanings or solutions to given situations or problems.	1. identify “working” assumptions in forensic science and seek alternative explanations or meanings for their results. 2. interpret and explain evidence from a crime scene, utilizing different possible scenarios and interpretations.
<u>MnTC Goal 2c</u>	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. analyze the logical connections among the facts, goals, and implicit assumptions in experimental and controversial work in forensic

		science in the process identified above (in MnTC Goals 2a and 2b), as well as generate and evaluate implications and/or conclusions that could be drawn from them. 2. evaluate current and historical cases. Explain the evidence collection and the assumptions and limitations of what could be learned at the time of collection to what can be learned today.
<u>CS</u>	demonstrate an understanding of the forensic elements of the crime scene, including securing the crime scene, criminal evidence, and evidence collection.	1. complete a rough and finished crime scene sketch. 2. explain the responsibilities of the first officer on the scene, what evidence to collect, and how to collect and secure the evidence.
<u>CS</u>	demonstrate an understanding of the importance of evidence, including its physical and/or chemical properties.	1. identify chemical and physical evidence. 2. explain what types of analysis would be best suited to each identified piece of evidence.
<u>CS</u>	recognize the tools of forensic science, including learning the uses of the different types of microscopes, gas chromatograph, spectrophotometer, and micro-spectrophotometer as they apply to forensic investigation of soil, fingerprints, hair, fibers, and paint.	1. use a microscope to examine trace evidence, hair, fingerprints and other biological/physical evidence. 2. examine the chemistry of ink by performing a chromatography experiment. 3. examine the uses and applications of spectrophotometry and micro spectrophotometry.
<u>CS</u>	demonstrate an understanding of the importance, implications, and uses of biotechnology in the analysis of forensic evidence, including DNA fingerprinting, RFLP and PCR technology, etc.	1. explain the difference between nuclear and mitochondrial DNA. 2. explain the types of electrophoresis and STR analysis. 3. explain how national databases for DNA and fingerprints are utilized.
<u>CS</u>	examine techniques used in forensic toxicology and serology.	1. examine current accepted presumptive and confirmed methods used in drug and alcohol testing. 2. explain the ABO blood typing system, examine the behavior of blood drips on different surfaces and at different heights, and spatter patterns.

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 accommodation 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: 04/05/11; 01/31/18; 09/06/22; 03/05/24

AASC Approval date: 03/08/18; 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.

*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