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 focus of forensic science is the crime lab using scientific principles and techniques in order to analyze evidence that would be admissible in court. An orientation to crime scene investigation and evidence collection will lead to analysis of the following: Impressions, drugs and powders, blood, serology, hair, questioned documents, firearms/tool marks, bones, glass, paint, fibers, and DNA. This course is activity-based and the student participates in a variety of lab and lab-like experiences demonstrating the principles covered in the course and illuminating how scientific experimentation and research are performed and interpreted.
(MnTC (Goal 3/NS and Goal 2/CT); (3 Cr – 2 lect, 1 lab)

C. *MnTC Discipline: Natural Sciences **Core Theme: Critical Thinking

D. 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
- DNA evidence
- Fingerprints and other impressions
- Firearms and tool marks
- Document examination

E. GOAL TYPE, OBJECTIVES, AND OUTCOMES:

GOAL TYPE	OBJECTIVES Students will be able to	OUTCOMES The student will successfully
MnTC Goal 3a	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. 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, 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.
MnTc Goal 3c	communicate their experimental findings, analyses, and interpretations both orally and in writing.	1. discuss experimental findings in oral and written formats.
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. demonstrate the ability to evaluate societal issues related to forensic science and criminal justice from a natural science perspective. 2. formulate critical analysis questions regarding physical and forensic evidence. 3. make and communicate informed judgments about criminal justice and forensic science topics and related policies.
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. 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.
MnTC Goal 2b	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.
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. 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 controversial cases and explain the evidence from different possible viewpoints, as well as analyzing the assumptions underlying each.
<u>CS</u>	demonstrate an understanding of the history and application of forensic science, as well as the limitations of the discipline, including the study of famous cases.	1. analyze a famous case history in forensic science (i.e. the Lindbergh kidnapping) and explain how forensic science contributed to the solution of the case, as well as how the case could be solved with current techniques. 2. explain the limitations of forensic science at that time in history, and compare to the limitations at the current time.
<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 rough and finished crime scene sketches. 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 the physical and chemical properties of physical evidence, and organic and inorganic chemical analysis of evidence.	1. identify the elements of criminal evidence and 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 microscope, chromatograph, spectrophotometer, microspectro-photometer, computer forensics, and the use of Internet and forensic technology, especially as applied to the study of forensic evidence such as soil, fingerprints, hair, fibers, and paints.	1. identify different types of microscopes, explaining how each might be used in forensic science. 2. sketch and identify each part of a hair shaft and follicular tag, as well as the various stages of growth of hair. 3. generate and analyze a complete fingerprint set. 4. complete analyses of primary fingerprint ridge characteristics, as well as explaining how national databases are used to establish evidence.
<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 significance, characteristics and replication of chromosomal DNA and mitochondrial DNA. 2. explain how DNA is fingerprinted and analyzed in the forensic laboratory. 3. explain how national databases for DNA fingerprints are utilized.
<u>CS</u>	participate in 'solving' cases requiring an understanding of the application of additional branches of forensic science, including forensic serology, toxicology, and anthropology.	1. compare and evaluate the current accepted methods of alcohol testing for reliability and validity. 2. complete an analysis of a crime scene area, including blood spatter analysis. 3. explain the sources of the different types of drop and spatter patterns, and the significance of blood evidence at a crime scene.

			4. identify the process for the proper collection of evidence from a rape victim and suspect, and explain the application of the tests for semen analysis.

F. 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 the instructor or the Student Success Center 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.

G. COURSE CODING INFORMATION: Course Code C/Class Maximum 48; Letter Grade

Revision date: 04/05/11; 1/31/18
AASC Approval date: 3/8/18

*Riverland Community College Disciplines	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

**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

*These five MnTC Goals have been identified as Riverland Community College Disciplines.
** These five MnTC Goals have been identified as Riverland Community College Core Themes.
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.