

Biomedical Science & Human Disease

HLTH 095: 3 Credits

Prerequisite: None

Eligibility: Any Current High School student, or High School graduates

DESCRIPTION:

Medical laboratory science professionals are vital healthcare detectives, competent in the collection, processing and analysis of biological specimens, the performance of lab procedures, the maintenance of instruments, and relating lab findings to common diseases/conditions that assist physicians in patient diagnosis and treatment, as well as in disease monitoring or prevention. This course has been designed to introduce students to the field of Medical Laboratory Science. The course combines lecture and laboratory practice, to allow students to demonstrate professionalism and interpersonal skills while achieving competence with common laboratory procedures virtually. As an online course, students will be assigned with lectures and laboratory assignments towards the beginning of the course and will be assigned case studies, that are related to the acquired knowledge, during the latter half of the course. Cases will include case history presented, clinical signs and symptoms, initial and additional laboratory testing and data, relevant test methodologies employed and accurate interpretation of results.

COURSE OBJECTIVES:

1. Demonstrates proper handling of patients/specimens and evaluate situations that may cause adverse issues
2. Demonstrate skill with some laboratory equipment
3. Demonstrate competence with laboratory mathematics and quality control
4. Comply with laboratory safety protocols by demonstrating proper technique
5. Renal anatomy and physiology, formation of urine and microscopic identification of elements found in a urine sediment
6. Basic understanding and analysis of blood and other body fluids
7. Basic understanding of hematology, immunology, clinical chemistry and microbiology with emphasis placed on point of care testing in all areas of the laboratory.
8. Correlate abnormal laboratory test results with various disease states.

MAJOR TOPICS:

- Laboratory Safety
 - o Bloodborne Pathogens
 - o Chemical Hygiene
 - o Exposure Control Plan
 - o PPE, Safety Devices & Techniques

- Blood/Specimen Collection & Quality Control
 - o Renal Anatomy & Physiology
 - o Physiologic Assessment Using Urinalysis
 - o Correlating Diseases with Abnormal Results
 - o Laboratory Procedure: Urinalysis
 - o Accuracy & Precision
 - o Statistical Formulas and Implementation
 - o Statistical Analysis of Laboratory Procedures

- Bloodbank, Hematology & Immunology
 - o Blood Cells
 - o White Blood Cell Morphology
 - o Red Blood Cell Morphology
 - o Laboratory Procedure: Identification of Blood Cells Under the Microscope
 - o ABO & RH Blood Types
 - o Laboratory Procedure: ABO/Rh Typing
 - o Autoimmune diseases

- Basic Principles of Clinical Chemistry & Clinical Microbiology
 - o Clinical Significant Pathogen vs. Normal Flora
 - o Bacterial Identification
 - o Bacterial Morphology: Gram Stains
 - o Laboratory Procedure: Gram Stains
 - o Glucose Metabolism and Regulation
 - o Diseases Associated with Glucose Metabolism
 - o Cardiac markers and Tumor markers

- Molecular Module
 - o DNA Isolation
 - o Cell Division
 - o Gel Electrophoresis

- Professional Development
 - o Importance of Effective Communication in a Clinical Setting
 - o Effective Written Communication
 - o Effective Verbal Communication

COURSE INSTRUCTOR: Koela Ray, MS
302I Rowell
Email: Koela.Ray@uvm.edu

Office Hours (July 06th – July 31st): TR 9:00 AM – 3:00 PM (Virtual meeting, by appointment)

RESOURCES:

Top Hat (Required):

The platform Top Hat will be used throughout the first two weeks of in class session. All class materials and homework assignments will be provided through this platform.

TEXTBOOK (Not Required):

CLINICAL LABORATORY SCIENCE: Concepts, Procedures, and Clinical Applications
7th Edition. Authors: Linne and Ringsrud
Publisher: Elsevier. ISBN 978-0-323-22545-8

If you would like to purchase the electronic version of this text you may find it on Elsevier's website. It is a bit less expensive.

ONLINE Module: There will be no standard meeting times during the entire course, and materials will be delivered asynchronously. Both *UVM Blackboard* and *Top-Hat* will be used for the online section. Lecture and virtual laboratory materials with assignments will be posted in sections with specific deadlines. These due dates for your assignments, can be found in the course schedule. Please review these regularly and in addition, you will receive reminders prior to the due dates.

Online modules will require about 5 to 8 hours of work, per day, which students can complete at their convenience. Students are expected to work independently on the cases and assignments and discuss with the rest of the class at the end of each task, through online discussion forums.

Late work will not be accepted. Assignments will not be graded after the deadline. If you have an extenuating circumstance, please contact me by private message before the assignment is due to make alternate arrangements.

DISCUSSION FORUMS

Discussion Forums are a way for you to engage with each other about the course content. Each lesson module will have a question that links to a forum. You can also access each forum by clicking on the **DISCUSSIONS** button in the course navigation

links. In order to get full credit for each discussion, you will need to post a thoughtful, well-written response to the question and respond to one of your classmates' answers.

EXAMS AND GRADING POLICY:

GRADING: Your grade in this course will be derived from your efforts the cumulative final presentation for lecture and lab, class participation and exams, and completion of case study homework.

A letter grade for this course will be determined by the following:

Lecture

Midterm	10%
Final Exam	15%
Presentation	15%
Participation (Quizzes)	15%
Case study Homework	20%

Laboratory

Laboratory	25%
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Total _____ **100%**

Your letter grade earned in the course will be based on the numerical ranges given below.

<60 = F	60 - 62 = D-	70 - 72 = C-	80 - 82 = B-	90 - 92 = A-
	63 - 66 = D	73 - 76 = C	83 - 86 = B	93 - 96 = A
	67 - 69 = D+	77 - 79 = C+	87 - 89 = B+	97 - 100 = A+

You are encouraged to discuss your grade status with the instructor at any time.

VIRTUAL LABORATORY AND LABORATORY ASSIGNMENTS: Each laboratory exercise will be accompanied by a series of questions for practice only and will not be graded. Some questions may require you to research the answers outside of the laboratory period. The course laboratory portion is worth 25% of the course grade. The exercises are intended to help you have a better understanding of the material covered in the lectures.

Participation: Participation in the lecture and laboratory, during the first two weeks, is expected and worth 15% of your final grade. Skipping lecture material will definitely

impact your understanding of course contents and affect grades. Most laboratory sessions are designed to help with better understanding of the lecture concepts.

Presentation: Presentation guidelines and a list of topics will be provided after the first week of classes. Students will have the option of selecting a topic from the list but does not have to it.

ACADEMIC INTEGRITY: The concepts of academic integrity apply to this course. This means that all work turned in under your name, including laboratory reports, laboratory quizzes and exams must be the product of your own work or else appropriately referenced. Copying the work of others without permission or without identifying it as someone else's work is plagiarism and is a violation of academic honesty. Unless specifically noted, all work should be your own.

Code of Academic Integrity: All academic work must conform to the UVM Code of Academic Integrity: <http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf>. Violations may be in any of the following categories: plagiarism, fabrication, collusion or cheating. Any student, member of the University staff, or faculty may report any perceived violation of this Code to the Center for Student Ethics and Standards. Charges will be heard by the Academic Integrity Council. Sanctions may range from a letter of warning to dismissal from the University.

REASONABLE ACCOMODATION FOR LEARNING DISABILITIES: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. Please click on this link, Accommodation Guidelines, to better understand the process. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Contact SAS: A170 Living/Learning Center; 802-656-7753; access@uvm.edu; or www.uvm.edu/access

NAME USED IN CLASS: The official UVM roster now lists a student's "preferred" name. If you wish to be addressed by a different name than what is listed, please let us know.

COURSE EVALUATION: An anonymous, on-line course evaluation is expected to be completed by each student at the end of the course.

Key points to remember throughout the course:

- Take part in class discussions. Asking questions will make the course more interesting to you and will help clarify subject matter for everyone.
- Be sure that you understand the foundational principals discussed in class. Memorizing slides before an exam will not help you in this course.
- There is a large amount of material covered in this course. Studying in small groups tends to be effective in classes like this. You can learn from one another.
- The final exam is a comprehensive exam. Start keeping an inventory of what you've learned. You will use it again, and you will build on it in future semesters, if you wish to join the program!