Introduction to Medical Diagnostics

HLTH 095: 3 Credits

Prerequisite: None

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

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. Students will be given the opportunity to demonstrate knowledge in making solutions, using aseptic techniques, and handing laboratory equipment. For the online section of the course, students will be assigned case studies, which 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 the microscope, centrifuge, and other 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 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
  - Bloodborne Pathogens
  - Chemical Hygiene
  - Exposure Control Plan
  - PPE, Safety Devices & Techniques

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

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

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

- Infectious Disease

- Molecular Module
  - DNA Isolation
  - Gel Electrophoresis

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

CLASS TIMES:

Lecture: MWF 9:00 AM – 12:45 PM (Waterman 413)

TR 9:00 AM – 5:00 PM (Waterman 413)

Laboratory: MWF 1:45 PM – 5:00 PM (Rowell 113)

COURSE INSTRUCTORS: Koela Ray, MS
302I Rowell
Email: Koela.Ray@uvm.edu
Office Hours (July 20th – August 3rd): MTW 9:00 AM – 12:00 PM (Rowell 302I)

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.

EXAMS AND GRADING POLICY:

GRADING: Your grade in this course will be derived from your efforts the cumulative final examinations for lecture and lab, class participation and attendance, and completion of case studies.

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

Lecture	
Final exam	25%
Attendance/Participation (Pop Quiz)	15%
Case study	40%
Laboratory	
Laboratory final exam	20%
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.

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. There will be a final laboratory exam worth 20% of the course grade. The exams are intended to help you understand the material covered in the laboratory.

Note: *UVM requires all personnel to complete certain online/in class trainings before the start of any laboratory work. Students enrolled in the course will be provided with links for adequate online trainings before the start of the course, with ample time for completion. In class trainings on the first day of lab work, will be provided by Laboratory Safety Officer of the department.*

ONLINE MODULES: There will be no standard meeting times during the online session. Students will be assigned case studies starting July 20th, 2018. Case studies with assignments will be posted in sections with specific deadlines. Timely submission is highly encouraged and points will be taken off for any late submission. Online modules will require about 7 to 8 hours of work, per day, which students can complete at their convenience. Students are expected to work in groups and independently on the cases and discuss with the rest of the class at the end of each case, through online blogs.

ATTENDANCE: Attendance and participation in the lecture and laboratory, during the first two weeks, is expected and worth 15% of your final grade. Absences from lectures will definitely impact your understanding of course material and grades. Most laboratory sessions are difficult to reschedule due to sample preparation and time constraints. You are expected to be present and actively participate in ALL laboratory sessions. If you are ill and unable to attend, please call or email Koela Ray koela.ray@uvm.edu as soon as you can.

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.

CONDUCT IN CLASSROOM: Students are expected to treat others with respect in the classroom. If you engage in behavior that disrupts a classroom you may be subject to disciplinary action under the Code of Student Rights & Responsibilities. http://www.uvm.edu/~uvmppg/ppg/student/studentcode.pdf

Disruptive classroom conduct means engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning.

Cell phone usage is not permitted in class. Please turn off all cell phones, or set to vibrate before coming into class and specially laboratory. If you are found using your cell phone in class, you will be asked to leave. *Cell phones cannot be used as calculators during lectures, laboratories and exams.*

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 cumulative! 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!