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### BIOM 408.01: Clinical Diagnosis Laboratory

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# Syllabus BIOM 407/408 – Clinical Diagnosis – Spring 2015

Lecture Classroom: Health Sciences Room 411, M W 4:10 – 5:00 pm

Lab Classroom: Health Sciences Room 404, T R 1:10 pm – 3:00 pm

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## Course Instructor:

Pam Shaw (MT) ASCP, adjunct instructor  
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Office hours: Monday – Thursday mornings by appointment

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## Course Description and Intended Audience:

This course is intended to introduce the student to the clinical lab. The organization and departmentalization of the laboratory will be presented. Quality control, laboratory equipment and technology will be broadly discussed. In each of the various lab departments (hematology, urinalysis, blood bank, chemistry and microbiology) common tests and their significance will be covered. The overall goal is to prepare the student for their subsequent internship in Medical Laboratory Science. Non Med Tech majors will gain an appreciation for the importance the laboratory plays in diagnosing and monitoring human pathology. Laboratory exercises will entail a sampling of manual testing performed in clinical labs as well as “field trips” to area laboratories to gain a hands-on view of daily laboratory activity. It is highly advised to take both the lecture and lab together as they build on one another. Lectures will include discussion of actual clinical cases.

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## Course Materials:

### Textbook Materials Required:

1. Linné & Ringsrud's Clinical Laboratory Science. Turgeon. Elsevier 2012. ISBN: 9780323067829
2. Fundamentals of Urine and Body Fluid Analysis. Brunzel. Elsevier 2012. SBN: 9781437709896
3. Fac-Pac for lab. Contains all lab exercises. Available at UM Bookstore.

### Moodle Supplement:

1. This course includes a Moodle supplement. All notes from lecture will be posted on Moodle the week before lecture. Important handouts or web resources will also be listed here. Notes are to be used to review material and as a guide for studying for tests. Handouts are offered as an option to print and bring to class for easier note taking. The slides are also numbered, so an option to printing the handouts is to jot a slide number that you are making a note about to reference as you review the slides. If you have not used Moodle before, be sure to take the online tutorial.

### Laboratory Equipment:

1. Each student will be responsible for having a laboratory coat at each lab. Space will be provided to store the coat in the lab. Failure to wear a lab coat and closed toed shoes will result in being asked to leave the class, which will count as an unexcused absence.
2. Safety glasses or goggles are recommended but not required. Eyeglasses are acceptable.

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## Learning Outcomes (Lecture):

1. The student will gain an understanding of the fundamentals of the Clinical Lab, the role of a Clinical Laboratory Scientist and how the lab intertwines with quality patient care.
2. The student will be able to define quality control and quality assurance and how each is properly utilized in a clinical laboratory to assure the best patient outcomes.
3. The student will gain knowledge of correct specimen collection procedures and the importance behind those procedures. Phlebotomy will be discussed and the student will be tested on principles, but actual blood drawing by students will not be done in this class.
4. The student will gain understanding of renal function and learn the various tests performed in routine urinalysis.
5. The student will be exposed to principles of immunology and the various immunologic test methods used in the clinical lab to diagnose/monitor disease.
6. The student will review current Blood Banking procedures and regulations. They will understand the serologic principles and current transfusion practices.
7. The student will be lead through the most commonly ordered tests in the Chemistry Department of the laboratory. They will apply the physiology of several different organs to specific tests designed to detect or monitor disease.
8. The student will review the various forms of Hepatitis and the commonly used screening tests.
9. The student will gain an understanding of identifying and interpreting abnormal results.
10. The student will gain an understanding of hemostasis (coagulation), disorders of hemostasis and current laboratory tests used for hemostasis.
11. The student will learn how other body fluids such as fecal and vaginal secretions are used in clinical diagnosis.
12. The student will explore professionalism and ethics as an integral part of the medical care team.

## Learning Outcomes (Laboratory):

1. The student will have a solid understanding of laboratory safety practices and know exactly what is required for Universal Standards practices in clinical laboratories.
2. The student will understand the proper use of glassware, pipettes, balances and solution preparation.
3. The student will become adept at using the microscope properly.
4. The student will learn how to analyze a routine urinalysis, including microscopic exam and identifying normal and pathologic components.
5. The student will learn the correct method for setting up Urine cultures and Sensitivities. They will learn how to assess the significance of the results.
6. The student will perform immunologic tests such as ELISAs, drugs of abuse screening, and Group A Strep screening. They will learn the principles behind the tests, the interfering substances/conditions that can result in errant testing, as well as the pathology of the diseases tested.
7. The student will perform ABO/Rh and antibody screening as part of routine Blood Bank testing in the Clinical Lab.
8. The student will perform fecal occult blood tests. They will learn the principles behind the test, the interfering substances/conditions that can result in errant testing, as well as the significance of findings.
9. The student will tour multiple area Clinical Laboratories, giving them insight to the actual work place.

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## Grading:

### Total Points and Grading Policy:

Final grade will be determined as a percentage of points based on the following; Lecture: 3 tests, 4 quizzes, a news assignment, a research assignment and a cumulative final. Lab: 6 lab exercises, 9 quizzes, 2 lab tours and a lab final. Pass-Fail grade: students in the P/F status must earn the equivalent of a "C" grade for a P. I do not grade on a curve.

#### Lecture:

Total lecture tests:	300 pts. (3 x 100)
Quizzes	80 (4 x 20)
News assignment	20
Research assignment	25
Final test (cumulative)	100

Total Possible: 525

#### Lab:

Quizzes	90 (9 x 10)
Exercises	60 (6 x 10)
Lab tours	50 (2 x 25)
Final test	50

Total Possible: 250

A+	97-100
A	93-96.9
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9
D+	67-69.9
D	63-66.9
D-	60-62.9
F	Below 60

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## Course Expectations and Requirements:

### Prerequisites:

BIOM 360/361 General Microbiology or BIOH 365 Anatomy & Physiology or BIOM 402/402 Medical Bacteriology & Mycology (may concur) or by consent of the instructor.

### Attendance:

Attendance is expected in all lectures and laboratory sessions. There will be information shared in lecture that is not in the notes or the text. Absence from lectures will cause you to miss important content. Quizzes and/or laboratory exercises may not be made up. **More than two unexcused absences from lab will result in lowering of final grade by at least one letter grade point.** Tests may only be made up with prior approval of the instructor and will require **legitimate documentation** of reason for absence. Examples of documented circumstances that may merit approval include the following: 1) illness or accident, 2) death or family emergency, 3) university sanctioned activity.

### Reading Requirements:

Reading requirements are spelled out on the schedule. Students are expected to read the required reading **before** class – especially the lab FacPac (see explanation of quizzes below). The text as a whole will go into more detail than I will in lecture, however, it helps to understand the big picture. The quizzes at the end of the chapters are helpful for review; with answers in the back of the text to self check your answers. I recommend taking the time to do these quizzes – it will really help you understand the main points.

### Tests, quizzes, lab exercises, and assignments:

For lecture there will be three exams (non-cumulative), 4 quizzes (may be un-announced), and a cumulative final. There will be an oral assignment to report on lab medicine in the news and a written assignment researching a "send-out" test, including purpose, test methodology, and normal reference values. The lab quizzes will be as follows: at the start of every lab, a ten-point quiz will be given. The questions will be from the required reading for that day's lab to be sure you understand what it is you will be doing in lab that day. Lab exercises will be completed in labs doing bench work. The cumulative lab final will include visually

identifying cells and cell components from power point slides. There is a tremendous amount of material to cover in this course. It is not particularly difficult, but if you fall behind, catching up will be an uphill battle. As mentioned before, quizzes cannot be made up, so missing class or lab will hurt you in more ways than one.

### **Graduate Level Increments:**

For those students enrolled as a graduate course, there will be higher expectations and additional assignments. For the lecture, the graduate student will be required to complete a 8-10 page research paper reviewing at least 6 published research journal articles on the appropriate use of a common lab test such as PSA (Prostrate Specific Antigen). There is a lot of discussion on appropriate use of lab tests, when they are over-used, under-used or not as relevant with new technology replacing them. The student may pick a topic or test of choice upon approval of instructor. The paper will include a bibliography and must be of publishable quality (grammar, content, outline, etc.) This assignment will be worth 50 points added to the total possible points for the class. The paper will be graded on relevance (10 points), thoroughness of research (10 points), grammar/spelling (10 points), conclusion (10 points) and overall presentation including outline & bibliography (10 points.) For the lab, the graduate student will be required to make arrangements with the instructor and/or a local clinical laboratory to job shadow a Med Tech for at least one 8 hour shift in one or more department of the clinical laboratory and write a 2-page written report worth 25 points on aspects of the field that were new, challenging or interesting to the student. It will be graded on the depth of insight to the observation. Merely listing tasks or procedures that were observed is not sufficient.

### **Email Communications:**

I will use email to communicate schedule changes and other notifications. I will only use the official University email address, so be sure to check your email regularly.

### **Professionalism and Classroom Etiquette:**

Medical Technologists, Physical Therapists, Pharmacists, Exercise Physiologists, Dieticians, Nurses, etc. are all considered professionals in the health care field. Being enrolled in this class, you are expected to act professional at all times, observing safety standards, confidentiality rules, and demonstrating ethical behavior. Please be on time to class, turn off all cell phones and leave them out of sight. Laptops and tablets are acceptable only if they are used for note taking or following notes on Moodle. No cell phones, computers, or other electronic devices may be used during exams. Some basic math will be utilized on tests, but you will be expected to perform these functions without aid.

### **Students with Disabilities:**

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability with the potential to adversely affect your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154 (phone: 243-2243) or consult their website: <http://life.umt.edu/dss>. Please let me know as soon as possible about any assistance you may need. I will work with you and DSS to provide an appropriate accommodation.

### **University Policy for drops, adds, or changes of grade option:**

It is the student's responsibility to know the required dates for drops, adds or changes of grade option. I will not bend the rules on this. Please consult the registrar's website for specifics.

<http://www.umt.edu/registrar/students/dropadd.php>

### **Academic Honesty and Misconduct:**

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Anyone caught plagiarizing or cheating on an exam or assignment will be given a grade of "F" for the course and will be reported to the Department Chair and the Dean of Students. All students must be familiar with the Student Conduct Code. The code is available for review online at: [http://www.umt.edu/vpsa/policies/student\\_conduct.php](http://www.umt.edu/vpsa/policies/student_conduct.php)

## Emergency Preparedness and Response:

Should an emergency of any type develop, please observe the following:

1. In the event we need to evacuate the building during lecture, our primary route will be through the classroom door to the closest stairwell, down four flights and out the nearest exit.
2. If you hear an alarm or are told to evacuate, always assume the emergency is real. Without panic, pick up your backpack, coat and valuables as the building may be closed for some time.
3. Do not use elevators as a means of evacuating.
4. In the event of a lock down, please follow all directions. If you are asked to stay in the classroom, please do so. If you have text enabled emergency notifications, you may use your cell phone for updates.
5. If you have a medical condition that will make evacuation a challenge, please inform me privately so we can plan an appropriate alternative and safe response.
6. Please take responsibility to assist others.

## BIOM 407/408 - Clinical Diagnosis Lecture and Lab Schedule - Spring 2015

		Oral assignment:	Required reading:
January	M 26	Lecture - Introduction	
	T 27	<b>Lab - Safety in the Lab</b>	Turgeon Chapter 2
	W 28	Lecture - Fundamentals of the Clinical Lab	Pam - example Turgeon Chapter 1
February	M 2	Lecture - Phlebotomy	Laura Turgeon Chapters 3
	T 3	<b>Lab - Equipment/Solution Preparation</b>	Turgeon Chapters 4, 7
	W 4	Lecture - QA-QC/POC Testing	Kayc Turgeon Chapters 8, 9
	M 9	Lecture - UA: The Kidney/ Renal Function	James Turgeon Ch 14, p 358-364
	T 10	<b>Lab - Microscopy (half of class)</b>	Turgeon Chapter 5
	W 11	Lecture - UA: Specimens, Physical Exam	Eliana/Brenda Brunzel Chapters 3,6
	<b>R 12</b>	<b>Lab - Microscopy (half of class)</b>	Turgeon Chapter 5
	M 16	No Class - President's Day	
	T 17	<b>Lab - Tour #1 - WMC (half of class)</b>	
	W 18	Lecture - UA: Specimens, Chemical Exam	Leonardo Brunzel Chapters 7
	<b>R 19</b>	<b>Lab - Tour #1 - WMC (half of class)</b>	
March	M 23	Lecture - UA: Microscopic Exam	Thomas Brunzel Chapter 8
	T 24	<b>Lab - UA: Samples</b>	Brunzel Chapter 3, 6, 7, 8
	W 25	<b>LECTURE TEST #1</b>	
	M 2	Lecture - Immuno	Cesar Turgeon Chapter 17
	T 3	<b>Lab - Urine Cultures (everyone)</b>	Turg Ch 16, p 492-3, 502-5
	W 4	Lecture - Immuno	Carolina Turgeon Chapter 17
	<b>R 5</b>	<b>Lab - Urine Cultures (everyone)</b>	Turg Ch 16, p 492-3, 502-5
	M 9	Lecture - Basic Lab Techniques	Adriel Turgeon Chapter 6
	T 10	<b>Lab - ELISAs</b>	Turgeon Chapter 17
	W 11	Lecture - Blood Bank	Turgeon Chapter 18
	M 16	Lecture - Blood Bank	Dylan Turgeon Chapter 18
T 17	<b>Lab - Strep Kits (everyone)</b>	Turg Ch 16 p 494-6	
W 18	Lecture - Blood Bank	Courtney Turgeon Chapter 18	
<b>R 19</b>	<b>Lab - Strep Kits (everyone)</b>	Turg Ch 16 p 494-6	
M 23	Lecture - Blood Bank	Donna/Kate Turgeon Chapter 18	
T 24	<b>Lab - Blood typing</b>	Turgeon Chapter 18	
W 25	Lecture - Blood Bank	Marjory Turgeon Chapter 18	
April	M 30	No Class - Spring Break	
	T 31	No Class - Spring Break	
	W 1	No Class - Spring Break	
	<b>M 6</b>	<b>LECTURE TEST #2</b>	
	T 7	<b>Lab - Tour #2 - CMC (half of class)</b>	
	W 8	Lecture - Chem	Gabriela Turgeon Chapter 11
	<b>R 9</b>	<b>Lab - Tour #2 - CMC (half of class)</b>	
	M 13	Lecture - Chem	Ana/Leticia Turgeon Chapter 11
	T 14	<b>Lab - Serum Protein Electrophoresis</b>	Turgeon Ch 6 p 149-154
	W 15	Lecture - Chem	Rachel Turgeon Chapter 11
	M 20	Lecture - Chem	Vanessa Turgeon Chapter 11
T 21	<b>Lab - Spectrophotometry</b>	Turgeon Ch 6 p 129-140	
W 22	Lecture - Hepatitis	Talita Turgeon Chapter 11	
M 27	Lecture - Coag	Ivy Turgeon Chapter 13	
T 28	<b>No Lab - Enjoy the day off!</b>		
W 29	<b>LECTURE TEST #3</b>		
May	M 4	Lecture - Fecal & Vaginal Secretions Analysis	Christie Brunzel Chapters 10, 16
	T 5	<b>Lab - Occult Blood</b>	Turgeon Chapter 9
	W 6	Lecture - Professionalism/Ethics	Antonio/Lucas Participation required
T 12	<b>LAB FINAL - 1:10 - 3:10 PM, HS 404</b>		
W 13	<b>LECTURE FINAL - 3:20 - 5:20 PM, HS 411</b>		