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BIOH 405.01: Hematology

Denise P. Higgins

University of Montana, Missoula, denise.higgins@umontana.edu

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Syllabus BIOH 405 – Hematology – Fall 2021

Lecture Classroom: Skaggs Building Room 336, M W 12:00 – 12:50 pm

Lab Classroom: Health Sciences Room 404 T 1:00 pm – 2:50 pm

Please note: COVID-19 Contingency Plans, requirements, course changes, etc. are all highlighted in RED.

Course Instructor:

Denise Higgins MT(ASCP)
Office for Environmental Health Sciences, UM
Office: Health Sciences Room 106
Phone: TBD
e-mail: denise.higgins@umontana.edu
Office hours by appointment

Course Description and Intended Audience:

This course is intended to introduce the student to normal and pathologic hematology, with emphasis on cell development, cellular components and morphology. Laboratory exercises will instruct the student in proper specimen collection, preparation of peripheral blood smears, microscopic examination of blood smears, and other manual tests associated with blood and coagulation studies. Lectures will include discussion of actual clinical cases. While primarily designed for those students enrolled in the Microbiology Medical Laboratory Science option, this class is beneficial for any student involved in a health sciences career path. For the MLS majors, the class is designed to prepare the student for their year of internship, as well as preparation for the national certifying exam – Board of Registry, American Society for Clinical Pathology (BOR ASCP). For the non-Med Tech major, an understanding of normal and pathologic hematology will be beneficial in the overall understanding of their patients, the diseases they encounter and the treatments they are prescribed.

Course Materials:

Textbook Materials Required:

1. Hematology: Clinical Principles and Applications. Keohane. Elsevier 2020. ISBN: 978-0-323-53045-3
2. Clinical Hematology Atlas. Rodak. Elsevier 2017. ISBN: 978-0-323-32249-2
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. Moodle may also be utilized for quizzes/tests as a COVID contingency if there is an outbreak causing another campus shutdown or other implemented restrictions.

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. In the past, a box of used lab coats has been available for use. Due to COVID concerns, this box will only be available the first day of lab, to be taken home and laundered with bleach before wearing. The "freebie" box will not be available the rest of the semester. You are responsible for donning a clean lab coat each week. You will be required to wear gloves at all times and are responsible for using disinfectant to clean your area of the bench both before and at the end of class. 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 highly recommended, but not required. Eyeglasses are acceptable. It has been shown that SARS-CoV2 can be transmitted via eye membranes. I normally recommend doing microscope work without wearing glasses to protect the oculars and your eyeglass lenses, but due to infectious risk, I would recommend leaving your glasses or safety glasses on for this semester.

Learning Outcomes:

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 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 demonstrated 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 become adept at using the microscope properly.
5. The student will prepare peripheral blood smears and reticulocyte smears; and learn to identify the various normal and abnormal cellular components.
6. The student will be able to describe the normal production and destruction of hematopoietic cells, as well as the metabolism of hemoglobin and iron.
7. The student will learn a multitude of pathologic conditions resulting from metabolic, genetic, and acquired conditions.
8. The student will gain an understanding of identifying abnormal results, and how to interpret those results.
9. The student will gain an understanding of hemostasis (coagulation), disorders of hemostasis and current laboratory tests used for hemostasis.
10. The student will learn how other body fluids such as synovial fluid or cerebral spinal fluid is used in clinical diagnosis.
11. The student will learn how to make a differential diagnosis. An actual clinical case will be assigned each student. The student will examine a peripheral blood smear and based on the abnormal criteria he/she observes, make educated guesses as to the pathology involved. He/she will then list other laboratory or diagnostic testing that could be ordered to further confirm a suspected pathology. The ultimate goal of clinical pathology is to unravel a mystery using patient symptoms, laboratory and other diagnostic testing to diagnose and treat disease. Physicians rely heavily on clinical laboratory testing. Proficiency in proper specimen collection, testing (including proper QC/QA), and interpretation are key to best care patient practices.

Grading:

Total Points and Grading Policy:

Final grade will be determined as a percentage of points based on the following: 3 lecture/lab tests, 10 quizzes, 6 lab exercises, lecture/lab final, and workup of a clinical unknown blood smear. 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.

Total lecture/lab tests:	250 pts. (Test 1&2: 100 pts. each, Test 3: 50 pts.)
Quizzes	105 (Quiz 1: 25 pts., Quiz 2-9: 10 pts. each)
Lab exercises	80 (10 pts. X 8)
Blood smear (unknown)	25
Final test (lecture/lab)	150

Total Possible: 610*

*Total points may have to be adjusted if the University requires a shutdown, or further restrictions, affecting ability to do lab exercises or quizzes.

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

If you become very ill, and miss many classes or become unable to complete the Clinical Case assignment, please know that I will do everything I can to work with you through this. **If you take one thing away from this message** please know that I will do the heavy lifting when it comes to working out how we will connect and working out how to help you achieve your goals in the face of illness.

If I become very ill or incapacitated, there are contingencies for other faculty to take over the course, with as minimal disruption as possible.

Course Expectations and Requirements:

Prerequisites:

BIOM 360/361 General Microbiology or equivalent or by consent of the instructor.

Attendance: (Non-pandemic years...)

Attendance is required in all lectures and laboratory sessions. Attendance will be recorded. 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 are not always announced and may not be made up. Laboratory exercises may not be made up. **More than two unexcused absences from lecture or lab will result in a penalty of lowering the final grade by one letter grade point (in addition to the missing quiz/test scores).** 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.

Attendance/COVID-19 Contingency Plan

UM is committed to try to do as many face-to-face course interactions, with added safety measures in place, this fall semester. In the event that the spread of the Coronavirus Disease (COVID-19) leads to further disruption of UM activities and community-wide disruption of services, it may be necessary for students to stay in their homes/dorms, and for UM faculty to deliver content remotely, so as to continue course completion on schedule.

All students with cough/flu-like symptoms should NOT attempt to come to class. Email me **prior to class** and I will send links to lectures that you miss, so that there will be **NO PENALTY** attendance-wise. Videoconferencing (ZOOM) is enabled so that students with symptoms can participate digitally in the discussions. If you are ill enough not to attend those live video sessions, they will be recorded for later viewing. ***There will be no penalty for absence***, so long as you inform me of your situation.

Lab sessions create a more challenging situation. Each lab is very different by nature, so each missed lab will be treated on a case-by-case setting. Alternative assignments or activities will be offered as much as possible. We do a lot of microscopy in this course and that is difficult to emulate remotely. Depending on how much time is missed, individual make up sessions may be able to be scheduled. Again, I will do my best to make sure goals are met in the course. We are in this together, and a lot of understanding on both ends will get us through!

This is important: Although you may still feel able to go to class, by doing so **you put others around you at risk**. As healthy undergraduates, you are not the most "at risk" sector of our population, but it is your responsibility to do your part to make sure that you do not transmit the virus to others who might be at high risk (including student peers with severe asthma, respiratory conditions, and/or compromised immune systems, and many faculty and staff who are older and are at greater risk). If you think you might be sick, **STAY HOME** and we will find a way to accommodate the absence without penalty to your grade.

There are some very basic steps you can take to help us limit transmission of COVID-19. Wash your hands frequently. Washing your hands is the **BEST** way to prevent spread of any virus. Do not touch your face. Do not shake hands with others. Maintain a distance of 6 feet from others where possible. Masks are recommended when social distancing cannot be maintained. Remember that current data suggest COVID-19 can be transmitted by completely asymptomatic individuals. Our goal is to limit transmission.

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 normally will go into more detail than I will in lecture, however, the lecture and learning expectations are much clearer if the required reading has been done prior. There also may be an occasional question on a quiz or test that comes from the text that was not covered in lecture. 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 clinical unknown assignment:

There will be three mid-term non-cumulative tests that combine information from the lecture and lab. The lecture/lab final will be cumulative. The lab portion of the final will include visually identifying cells and cell components from power point slides. The quizzes will be as follows: at the start of every lab, a ten-point quiz will be given. Some of 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. The rest of the questions will be review questions from the last two previous lectures. These quizzes are designed to help keep you on track and up to speed. 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 lab will hurt you in more ways than one. Finally, the clinical unknown assignment will consist of reviewing a peripheral blood smear from a real clinical case. You will learn how to do this in the labs. You will offer potential diagnoses, as well as additional tests that would help differentiate possible disease states. This is a fun exercise and helps you to see what value the Medical Laboratory Scientist offers to the overall care of a patient. This class is one of the more hands-on, relevant courses of your education. Enjoy it, learn it and apply it!

IPE Component:

Interprofessional Education is..."when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes." – WHO, 2010. In many professional programs, IPE participation is a requirement. While the MLS program does not mandate this, I am a strong

advocate of the initiative. Therefore, I encourage all students to participate in one or more IPE activities and will award extra credit for participation (up to a maximum of 30 extra points). UMHM offers Friday Medical Conference talks and IPE workshops, as well as other activities. I will award 10 points to each FMC talk you attend (up to 3 talks, although you may attend as many as you wish). I will award 30 points if you attend the 3-hour IPE workshop on Oct 1, 2021. A flyer for the workshop will be put on Moodle. FMC talks take place at 7:30 am each Friday and **streamed live online. In order to get credit for attending, you must send a brief description within a day, including at least 3 key take-away points you learned during the talk you attended.** Please see <https://www.wmtahec.org/friday-medical-conference/schedule/default.php> for fall schedule.

Graduate Level Increments:

For those students enrolled as a graduate course, there will be higher expectations and additional assignments. For the course, the graduate student will be required to complete a 8-10 page research paper reviewing at least 3 published research journal articles on recent advances or treatment of a hematologic disorder. 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.)

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 Laboratory Scientists, 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 Office for Disability Equity (ODE). If you think you may have a disability with the potential to adversely affect your academic performance, and you have not already registered with ODE, please contact ODE in Lommasson 154 (phone: 243-2243) or consult their website: <https://www.umt.edu/disability/> Please let me know as soon as possible about any assistance you may need. I will work with you and ODE to provide an appropriate accommodation.

Basic Needs Resources

Any student who faces challenges securing their food or housing, and believes that this could affect their performance in this course, is urged to use/contact any or all of the following campuses resources:

- The UM food pantry is located at the West Atrium Desk on the first floor of the University Center. It is open 9AM-4PM on Tuesdays and Fridays.
- TRiO Student Support Services: TRiO serves UM students who are low-income, first-generation college students, or have documented disabilities. TRiO services include a book loan program, scholarships and financial aid help, and academic advising, coaching, and tutoring.
- ASUM Legal Services offers low cost legal advice and assistance to eligible students.
- ASUM Renter Center: Students can schedule an appointment with Renter Center staff, in order to discuss their situation and receive support and assistance.

- If you are comfortable, please come see me as well. I will do my best to help connect you with additional resources, e.g. the Curry Center, SARC, etc.

The Financial Aid office also offers short-term loans in cases of temporary hardships. Apply on Cyberbear.

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.umn.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 to the Dean of Students. All students must be familiar with the Student Conduct Code. The code is available for review online at: <http://www.umn.edu/student-affairs/documents/Student Conduct Code.pdf>

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 stairwell, down 2 flights and out through the Skaggs lobby door. During the laboratory sessions in Health Sciences building, we will exit through the classroom down the nearest stairwell to the ground floor 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.