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BIOM 403.01: Medical Bacteriology & Mycology Laboratory

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BIOM 403 Medical Bacteriology & Mycology Lab syllabus- Spring, 2022

Room- HS 404

Meeting- Tuesdays and Thursdays at 3:30-5:20 pm

Professor- Mike Minnick (HS 509B; phone- 243-5972; mike.minnick@mso.umt.edu)

TA- Adam Drobish (Clapp 206; adam.drobish@umconnect.umt.edu)

Text and Moodle: A course pack for this course is required and available from the bookstore. In addition, *A Photographic Atlas for the Microbiology Laboratory* (by Leboffe and Pierce, 4th Ed.; Morton Publishing Co.), is required. Additional, helpful materials / protocols may be occasionally uploaded to Moodle for student access.

Attendance: Attendance is **mandatory**. *Students with more than two unexcused absences will be required to drop the course.* Labs must be experienced for you to learn, and your partner is depending on you.

Late Policy: There is a 10% reduction of total points per day of tardiness for assignments.

Exams: The midterm exam will cover all labs up to the scheduled date. For review you should go over your lecture notes and information sheets in this packet. It will consist of short answer, fill-in-the-blank, and matching. There will also be “discussion” answer type questions. The final exam will consist of a **practicum** covering items that you learned over the course of the entire semester.

Lab notebook: You must keep a *bound* notebook for your observations and sketches done **during lab**. The notebooks *will be graded*, and you will need them for future reference on your unknowns. Lab notebooks may be collected or viewed for grading at the discretion of the TA. Each lab (for example “Gram Positive Cocci”) should have: 1) a heading, 2) procedures (can be referenced), 3) observations (must be current) and 4) a brief summary. There should be a table of contents and the pages of the notebook must be numbered. You are encouraged to cut and paste procedures, graphs, charts, or anything else that you might find useful into your notebook. Remember- the notebook will be extremely useful when you compile bacteria identification data.

Lab performance: Occasionally you will be asked to demonstrate certain lab procedures to the TA. For example, you may have to show a Gram stain of an organism, streak an isolation plate or demonstrate aseptic technique. The purpose of this is to ensure that everyone is on the same page in the lab. Don't be afraid to ask questions.

Flora isolates and unknowns: Floral isolates will be obtained and identified 4 times during the course of the semester. These are team projects. In addition, each student will be given an unknown culture mixture of 3 bacteria about half way into the course and will identify these bacteria to the species level. **Every student** will complete an “unknown report” (see page 41) detailing observations and tests used to identify the bacteria. A flowchart must be included. Be sure and turn in the reports on the due dates.

Accommodation and Accessibility- UM assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact ODE at: 243-2243, ode@umontana.edu, or visit www.umt.edu/disability. Retroactive accommodation requests will not be honored, so please don't delay. I will work with you and the ODE to implement effective accommodation, and you are welcome to contact me privately if you wish.

Academic misconduct: will be reported and handled as described in UM's Student Conduct Code available online at : <https://www.umt.edu/student-affairs/community-standards/default.php>.

Dropping course or changing the grading status will strictly follow UM policies and procedures, which are described in the catalog. Students cannot change to an audit after the 15th day of instruction. In addition, dropping the course or changing the grading status (to CR/NCR) are not automatically approved after the 30th day of the semester. These may be requested by petition, but the petition must be accompanied by documentation of extenuating circumstances. Requests to drop or change grading status to benefit a student's GPA will not be approved.

Grading: 600 pts total from-

Midterm exam ...100 pts	Flora unknowns120 pts (8 @ 15 pts ea)
Final exam100 pts	Midterm unknowns150 pts (3 @ 50 pts ea)
	Notebooks130 pts (26 @ 5 pts ea)

Cutoff points for A,B,C, and D = 90%, 80%, 70% and 60%, respectively.

Schedule-

Date	Day	Lab No.	Description
1-18	T	1	EXPECTATIONS & INTRODUCTION
1-20	R	2	BACK IN THE SADDLE
1-25	T	3	TRANSMISSION ROUTES
1-27	R	4	ID 2 isolates from transmission routes
2-01	T	5	Complete ID- turn in reports by next lab
2-03	R	6	GRAM + COCCI 1
2-08	T	7	GRAM + COCCI 2
2-10	R	8	ID 2 cocci isolates
2-15	T	9	Complete ID- turn in reports by next lab
2-17	R	10	AEROBIC GRAM + BACILLI 1
2-22	T	11	AEROBIC GRAM + BACILLI 2
2-24	R	12	ID 2 bacilli isolates
3-01	T	13	Complete ID- turn in reports by next lab
3-03	R	14	ENTERICS 1
3-08	T	15	ENTERICS 2 – review session
3-10	R	16	ID 2 enteric isolates / MIDTERM EXAM
3-15	T	17	Complete ID- turn in reports by next lab
3-17	R	18	UNKNOWNNS
3-29	T	19	Continue unknownns
3-31	R	20	Continue unknownns
4-05	T	21	Complete- turn in reports by next lab
4-07	R	22	ANAEROBES 1
4-12	T	23	ANAEROBES 2, API Diagnostic kits
4-14	R	24	ANTIBIOTICS 1
4-19	T	25	ANTIBIOTICS 2
4-21	R	26	HUMAN MYCOSES 1
4-26	T	27	HUMAN MYCOSES 2
4-28	R	28	FASTIDIOUS BACTERIA 1
5-03	T	29	FASTIDIOUS BACTERIA 2 and test review
5-05	R	30	LAB FINAL EXAM

Learning outcomes for BIOM 403:

TOPICS	LEARNING OUTCOMES
Orientation and introduction (1 lab)	-familiarize students with course expectations and grading -introduce TA and contact information

	<ul style="list-style-type: none"> -learn about proper lab notebook protocol as a requirement for course -Refresher on lab safety
Back in the saddle (1 lab)	<ul style="list-style-type: none"> -refresher on aseptic technique and handling of potential pathogens -refresher on streak plate isolation of bacterial clones -refresher on simple and gram stains of bacteria -refresher on oil-immersion light microscopy -learn proper placement and handling of cultures and contaminated waste
Transmission routes of infection (3 labs)	<ul style="list-style-type: none"> -familiarity with common transmission routes of potential pathogens -learn how to isolate bacterial strains from food, tap water, air, skin, fomites -refresher on colony morphology, gram staining -learn how to use dichotomous keys for identification -learn how to do a simple unknown and unknown report
Gram + cocci (4 labs)	<ul style="list-style-type: none"> -familiarity and application of selective and differential media for gram + cocci -learn physiological phenotypes of several pathogenic Staph and strep species -learn to isolate these bacteria from boils, pimples, skin, nostrils, throat, gingiva -learn how to identify unknowns from isolated bacterial strains from these habitats.
Aerobic Gram + bacilli (4 labs)	<ul style="list-style-type: none"> -familiarity and application of selective and differential media for gram + aerobic bacilli -learn physiological phenotypes of several <i>Bacillus</i>, <i>Corynebacterium</i> and <i>Listeria</i> species -learn to isolate these bacteria from throat, skin and raw milk -learn how to identify unknowns from isolated bacterial strains from these habitats.
Gram – Enterics (4 labs)	<ul style="list-style-type: none"> -familiarity and application of selective and differential media for gram – enteric bacteria- learn physiological phenotypes of several pathogenic enteric species, including <i>E. coli</i>, <i>Enterobacter</i>, <i>Shigella</i>, <i>Salmonella</i>, <i>Yersinia</i>, <i>Serratia</i>, <i>Klebsiella</i>, <i>Proteus</i> and <i>Citrobacter</i> -learn to isolate these bacteria from human fecal material -learn how to identify unknowns from isolated bacterial strains from fecal material.
Unknowns (4 labs)	<ul style="list-style-type: none"> -apply knowledge from course to identify a mixture of 3 unknown bacteria to the species

	<p>level</p> <ul style="list-style-type: none"> -practice what you have learned to become second nature -apply dichotomous keys for identification
<p>Gram + anaerobes (2 labs)</p>	<ul style="list-style-type: none"> -familiarity and application of selective and differential media for gram + anaerobic bacteria -learn physiological phenotypes of three <i>Clostridium</i> spp. -learn how to isolate these bacteria from soil and potato skins -learn how to cultivate anaerobic bacteria -learn how to identify unknown anaerobes from soil samples
<p>Antimicrobials / Diagnostic kits (2 labs)</p>	<ul style="list-style-type: none"> -learn classical antimicrobial sensitivity testing techniques, including Kirby-Bauer disk diffusion test and minimal inhibitory concentration determination -learn how to conduct a minimal bactericidal concentration test -learn how to test a battery of bacterial spp. for sensitivity phenotype to determine whether they are resistant, susceptible or intermediate susceptibility -learn how to use an API E20 diagnostic (multi test) strip on an unknown enteric bacterium -learn how to select resistance mutants from a population -determine the frequency of lactam-resistant <i>Staphylococcus aureus</i> in the normal flora of the human nostril.
<p>Human Mycoses (2 labs)</p>	<ul style="list-style-type: none"> -learn how to stain and observe fungi -learn how to cultivate fungi to preserve their morphology for microscopy -learn how to isolate and cultivate fungi from contaminated sources -learn how to conduct germ tube tests on pathogenic yeasts
<p>Fastidious Bacteria (2 labs)</p>	<ul style="list-style-type: none"> -learn how to grow fastidious bacteria such as <i>Campylobacter</i> and <i>Neisseria</i> spp. -learn how to conduct presumptive identification of such microbes