MICHIGAN STATE UNIVERSITY | College of Osteopathic Medicine

BMB 515 – Medical Biochemistry and Molecular Biology

Fall Semester 2 - 2017

Updated: 08/04/17 by R.Ritchie

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Notice to Students: Although Elective syllabi at MSUCOM have a consistent format; vitally important details differ by Elective. For this reason, you must read the syllabus thoroughly at the onset of each elective to understand what educational activities will be provided and what is expected of you.

Section 1 – Course Information

Course Description

BMB 515 is a 2 credit hour course that provides students with a survey of the major biochemical events occurring in normal cells and tissues. Where possible, examples will relate directly to human biology. The normal state will be described; abnormal conditions are considered insofar as they serve to illuminate the normal condition.

Course Goals

1. Present students with a survey of the major biochemical events that occur in normal cells and tissues
2. Provide students with a vocabulary of terms encountered in other basic science and clinical courses
3. Provide students with an understanding of the principal biochemical mechanisms that contribute to normal homeostasis and the inherent capacity of the individual for the maintenance of health and recovery from disease.

Please note that specific instructional objectives are provided within each lecture or other learning activity of this course.

Prerequisites at (college level):

One Year of organic Chemistry and 1 semester of biochemistry

Course Coordinator

(Note - Preferred method of contact is shown in italics)

Name: Raquel Ritchie, Ph.D.
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Address: 117-4 UC-4, MUC - 44575 Garfield Road, Clinton Twp., MI 48038

Course Faculty

Name	Email	Phone	Site
Martha Faner, Ph.D	fanermar@msu.edu	313-578-9669	DMC
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Curriculum Assistants

Name	Email	Phone	Site
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Cheryl Luick	luick@msu.edu	517-884-3880	EL

Lines of Communication

- For administrative aspects of the Course: contact the course coordinator Dr. Raquel Ritchie.
- For content questions relating to a specific lecture or topic: contact the faculty presenter for that specific portion of the course or your SE MI on-site instructor.
- For absences/missed exams (see excused absence information below)

Office Hours

Office hours for each campus are announced in site-specific folders under the Content tab in the D2L course website. Students are also encouraged: (a) to address questions and suggestions to instructors via the Email system; (b) to seek individual consultation with the lecturer or the on-site instructor by appointment throughout the semester; and (c) to use student led discussion board (see below). Questions concerning the course may be discussed individually by making an appointment with the Course Coordinator, Dr. Raquel Ritchie, Room 117 UC-4 MUC, by phone 586-263-6296 or via e-mail: rritchie@msu.edu. The Course Coordinator is generally available by appointment.

Course Web Site

The URL for the Course web site is https://d2l.msuedu/

The course D2L site has these PERTINENT sections:

- **News** - Course-related communication to the class will be made here. You should check for announcements on a daily basis.
- **Syllabus** – Contains the course syllabus with information about the instructional teams, textbooks, exam dates, grading system, rules and regulations, etc. This file can be found under the Content tab of the Course website.
- **Content** – Problem Sets, Homework Assignments, self-study modules (SSM), and other course-related materials.
- **Communicate** – Contains the course-related email system and the Discussion Forums.
- **Discussion Boards** – List of student “asked" questions organized by week and by lecture. The discussion board will be primarily student led. It is intended for students to use as a way to communicate with each other and teach each other. The BMB faculty will monitor the discussion board periodically. It is highly recommended that you check the discussion forum prior to sending a question to faculty as it is very likely that you are not the only student with questions – your question and others may already be available for your review – saving you time.

Note: Although each visit to any section of D2L by an individual student is "tracked" by the computer and the instructors of the course will have access to such information, we do not intend to use it.

Textbooks and Reference Materials

Required

- BMB 515 Course Pack
- Ferrier, D. Lippincott's Illustrated Reviews: Biochemistry, 7th ed. Wolters Kluwer, 2017. [ISBN: 978-1-49634-449-6]
- Wilkins, C. Understanding Biochemical Pathways: A Pattern Recognition Approach, 1st ed. Cognella Academic Publishing, 2017. [ISBN: 978-1-5165-0998-0 (Binder-Ready); 978-1-5165-2709-0 (VitalSource)]

Recommended

- K Turnpenny, P. and Ellard, S. Emery's Elements of Medical Genetics, 14th ed. Elsevier/Churchill Livingstone,2012. [ISBN: 978-0-7020-4043-6]
- Rhoades, R. and Bell, D. Medical Physiology: Principles of Clinical Medicine, 4th ed. Lippincott, Williams & Wilkins, 2013. [ISBN: 978-1-60913-427-3]

Required

- Three On-line Tutorials (TT) covering amino acid structures, nucleotide structures, and carbohydrate structures
- Self-study module on Gluconeogenesis (see course D2L site)

Other Instructional Material

The on-line tutorials are available on the BMB 515 course MediaSite catalog on a sub-folder labeled "Tutorials". Each tutorial title is preceded by "OPTIONAL" or "REQUIRED". There are three on-line tutorials that are required and they are labeled as REQUIRED. The other on-line tutorials labeled as OPTIONAL are available to you in case you need to review these concepts.

Type of readings for the course:

- **Required Reading**: These are REQUIRED readings that you have to read even if it is not covered in class. **You will be tested on this content.** These readings are best done after the class session in which it is assigned because it may be related to a lecture topic, but not covered in class.
- **Suggested/Clarification Reading:** These are OPTIONAL readings. If anything in a particular lecture or required reading is unclear please read these to clarify.

Additional instructional materials, including the three required tutorials (TT) and the self-study module (listed above), required readings, problem sets, and computer-based instructional aides, may be provided in the learning centers of COM at each site, as links at the course website, or as handouts at lecture sessions. **These materials are intended to be an integral aspect of the course; instruction in some course objectives may be accomplished entirely through these exercises and experiences, and**

thus might not be explicitly addressed during lectures. Students are strongly encouraged and expected to make use of them.

A listing of suggested and required readings can be found a the end of the syllabus

Opportunities to confirm your understanding:

Problem sets and their answers will be provided on the course D2L site for sessions 1-30. The Problem Sets for the tutorials and for sessions 6 and 13 are provided throughout the course pack. These problem sets are designed both to help the students grasp key concepts and connections and to provide practice in the skills and tasks defined by the educational objectives. Some problems may resemble typical exam questions in style and depth; others will be more open-ended or explorative. These problem sets will not be graded, but will provide students with an opportunity to assess their mastery of the objectives and to identify concepts that require further study.

Two practice exams, one for the BMB 515 portion of Unit Exam 1 and one for the BMB 515 portion of Unit Exam 2, will be available for you to take using computer-based testing (ExamSoft). Information on when the practice exams will be available and how to access them will be posted in the course D2L site and will be sent via email.

i>Clicker Use in Course

i>Clickers will be used in this class. See In-Lecture i>Clicker points on page 9 of this syllabus for more information. An i>Clicker 2 is required for this class. The mobile application, i>ClickerGO, will not be allowed.

In this course, i>Clicker input may be used in the following ways: to provide practice with concepts and principles, to stimulate discussion and/or to give in-lecture i>Clicker questions. Questions may be posed at any time during the class hour. No make-up experiences will be provided should you forget your i>Clicker. The i>Clicker will be the only mechanism to record attendance during large group lectures.

- If the i>Clicker is used to take attendance, you will be expected to arrive in class on time and to stay for the duration of the assigned activity.
- If you bring your i>Clicker and it fails during the lecture, please see the course representative immediately after the lecture to inform us of the problem. NO points for attendance will be given unless you notify us at the time of the lecture.

Please refer to additional i>Clicker policy information provided in Section 2 of this syllabus.

Supplemental Instruction (SI):

Supplemental Instruction is an academic assistance program that utilizes peer-assisted study sessions. The SI sessions are regularly-scheduled informal review sessions in which students compare their class notes, discuss assigned readings, practice problem solving, develop organizational tools, and predict test items. The participants learn how to integrate course content and study skills while working together. The sessions are facilitated by “SI leaders”, students who have previously taken the course, done well in it and are model students. The main purpose of this program is to improve students’ grades and their

overall learning ability. SI session attendance is OPTIONAL (there will be no points associated with SI session attendance).

Schedule for SI sessions:

SI Session Date	Time	EL location	MUC location	DMC location
Friday, 9/1	4-6 pm	E-202, E-105 and E-109	UC3 208	G029
Friday, 9/8	4-6 pm	E-202, E-105 and E-109	UC3 208	G029
Thursday, 9/14	5-7 pm	E-202, E-105 and E-200	UC3 208	G029
Friday 9/22	4-6 pm	E-202, E-105 and E-109	UC3 208	G029

Course-based Academic Support

The value you derive from this course (and those that follow it) will depend on many factors, but most importantly the amount of time and effort you put into it. In undergraduate courses, students often concentrate on just getting through the next exam or individual courses. But medical education is different because it is cumulative. Study for understanding, not just short term memorization. This will allow you to understand concepts and carry them forward with you to the next step in your medical education.

You are strongly urged to:

- Consult the course D2L web site frequently to see announcements and to access various study aids (e.g., follow-up to problem sets, practice exam questions, and answers to frequently asked questions).
- Complete the preparatory work assigned for each lecture session; this includes working through the online modules, problem sets or any other advance study activities.
- Attend every lecture and lab session.
- Actively annotate your Course Pack as you prepare for each class session, as each class session progresses, and also during your follow-up study.
- Complete the follow-up (supplemental) reading and self-study exercises as directed in the Course Pack and on the D2L web site.
- Use the practice exam questions (posted on D2L prior to each exam) to help guide your review and preparation for exams. Do NOT wait until the day before an exam to look at these practice exam questions. Instead, start using them several days prior to each exam to help guide your review and exam preparation.
- Each member of the teaching team has a well-deserved reputation for being approachable and for helping students achieve success. Avail yourself of the opportunities for help provided by the course faculty -- in person, via e-mail, and at scheduled help sessions or call them to schedule an appointment time.
- The time immediately before or after a course lecture is often too hectic to provide a good opportunity to get help from course instructors. By contrast, lab sessions (especially at the end when some of the students have already departed) or scheduled office appointments provide an excellent time to ask questions of course faculty.

- Keep in mind that you can contact course faculty by **e-mail** with your questions. Note: Whenever you pose a question by e-mail, include what you **THINK** the answer is. This makes it much easier for the instructor to either confirm your understanding and/or offer clarification.
- Face-to-face contact with faculty at lecture sessions -- In addition to the faculty person giving a lecture, one or more of the course faculty regularly sit in on course lecture sessions at each site. This provides you with an opportunity to pose a quick question or to request a personal meeting with your local campus faculty. E-mail is also a good way to set up a personal meeting with a particular faculty member.
- Study groups - Many students find it beneficial to study with one or more partners, and we strongly encourage this activity. Studying together can be efficient (what one student doesn't understand, another one will), stimulating (personal interaction can help keep you focused and alert), and motivating (commitment to a partner supplements self-discipline). We encourage you to study with suitable partners. We caution you, however, to avoid study groups that turn into "gab fests" or where one or two students do all the talking. Remember, you may THINK you understand a concept when you hear someone else explain it, but you'll KNOW you understand the concept only when YOU can explain it to someone else. So, make sure you get to talk in your study group!
- Caution: Scribe note services are not sanctioned by MSUCOM and are not endorsed by the course faculty. Course faculty assume no responsibility whatsoever for errors in the "scribe notes". It is unwise to expect the "scribes" to substitute for your own attendance in lecture or lab, your own note taking, or your own studying.
- Additional academic support resources can be accessed at:
- http://com.msu.edu/Students/Academic_Development/index.htm

Course begin and end dates

BMB 515 begins on August 28, 2017 and ends on December 4, 2017. For detailed daily course schedule refer to the Class of 2021, semester 2 page: (http://com.msu.edu/AP/preclerkship_program/preclerkship_curriculum/revised_curriculum/revised_semester_2_fs17.htm).

Evaluation of Student Performance:

The educational objectives defined for each section of this course, as outlined in the course pack, will serve as the basis for evaluating student performance. Mastery of these objectives will be expected whether those topics have been discussed in lecture sessions or explored using other resources (required tutorials, required readings, problem sets). Student attainment of these objectives will be evaluated using two quizzes, two exams, two homework assignments, and points from in-lecture i>Clicker questions (see Table below).

a. Each quiz will contain 7 questions, to be completed in the first 10 minutes of the class on the date stated, in the lecture venue. The quizzes will be administered using your personal computer-based testing device. The detailed “BMB Quiz Protocol” will be posted on the BMB 515 D2L site under the “Content” tab.

b. Unit exams 1 and 2 (see Table below)

Exams/Assessments

There will be a total of 2 exams, 2 quizzes, 2 homework assignments, and points from in-lecture i>Clicker questions in BMB 515 this year. Grades in BMB 515 are determined by your accumulated score of the following graded assignments in the table below:

Assessment	Projected Points	Material to be Covered
Quiz #1 Fri., 9/01/17	**7**	Sessions 1 through 5 plus the 3 tutorials
Unit Exam 1 Mon., 9/11/17	**54**	Sessions 1 through 15, the 3 tutorials and the GNG self-study module
Quiz #2 Mon., 9/18/17	**7**	Sessions 16 through 22
Unit Exam 2 Mon. 09/25/17	**45**	Sessions 1 through 30, CAS, the 3 tutorials and the GNG self-study module
In-Lecture i>Clicker 8/28/17-9/22/17	**3**	Content from lecture(s) and CAS
Homework Assignment 1 9/25/17-10/04/17	**4**	Sessions 14 through 28
Homework Assignment 2 11/30/17-12/04/17	**6**	Sessions 1-30 and CAS; and OST 551 Week 14 EBM: Basic Science Cases and searching the literature.
TOTAL POINTS	**126**	

ON-LINE Graded Homework 1:

The purpose of homework assignment 1 is to help students develop the ability to integrate basic science concepts from BMB 515 as well as other courses in the curriculum to answer patient questions in layman's language.
You must go to the D2L BMB 515 course site. Under the "Content" Tab, there is a folder entitled "On-line Homework Assignment 1". **The Homework Assignment will consist of a short essay response.** Further details and instructions, including how to submit your answers, will be provided with the homework assignment. The homework assignment will be available for ten days:

- **The Homework Assignment will be available from noon Monday, September 25, 2017 until 11:30 pm Wednesday, October 4, 2017.**

Part of your coursework, such as aggregate class data, may be used for the purpose of research on pedagogical development. No information will be identified with any individual. If you have any questions or concerns regarding this matter please feel free to contact the course coordinator Dr. Raquel Ritchie.

ON- LINE Graded Homework 2:

This homework assignment will be carried out in conjunction with the OST 551 session on Thursday, November 30, 2017. Two key educational goals are associated with this assignment: (1) to develop skills in searching the medical literature related to a clinical case so that deficiencies in distinct metabolic pathways can be delineated and distinguished; and (2) to illustrate the inter-connectedness of metabolic pathways, giving rise to similar but not identical clinical presentations and lab results. At the conclusion of the OST 551 session on November 30, please go to the D2L BMB 515 course site. Under the "Content" tab, access the folder entitled "On-line Homework Assignment 2." **The Homework Assignment will consist of six multiple-choice questions related to biochemical pathways addressed in the clinical case of OST 551.** Further details and instructions, including how to submit your answers, will be provided with the homework assignment. The homework assignment will be available for four days:

- **The Homework Assignment will be available from 5 pm, Thursday, November 30, 2017 until 11:30 pm Monday, December 4, 2017.**

In-Lecture i>Clicker points: Each student can potentially earn a maximum of 3 points (counting toward the 126 total points in the Course) by coming to class and participating in the i>Clicker session.

a. There will be one i>Clicker session every day for which there is a lecture in this Course except for days in which there is a quiz (a total of 16 i>Clicker sessions). Note that this includes the BMB 515 CAS session.
b. THREE of these i>Clicker sessions will have one point associated with the session. However, the three sessions that count will be disclosed only at the end of the course.
c. To get the point associated with an i>Clicker session, you will have to answer **at least one** of the "scientific content" questions in the i>Clicker session correctly.
d. Each i>Clicker session will begin with a "checking the date" question, which does not count as a "scientific content" question.
e. The number of "scientific content" questions for each i>Clicker session may vary.
f. The i>Clicker session may take place at any time during the class hour.
g. The answers to the i>Clicker questions will be posted on the course D2L site by 5 pm on the day of the i>Clicker session.
h. No make-up experiences will be provided should you not attend a session, if you forget your i>Clicker or if your i>Clicker does not work.
i. For example, if you come to class and participate in an i>Clicker session that counts, you may receive one point — as long as you answer at least one of the “scientific content” questions correctly for that session. If you attend class every day and participate in all of the i>Clicker sessions, you significantly increase your chances of earning the maximum 3 points for these i>Clicker sessions.

Clinical Application Session (CAS):

There will be one Clinical Application Session that will take place on Friday, September 22, 2017 specifically relating to material presented within the BMB 515 course (please refer to the corresponding BMB 515 lecture schedule). This session will be local and it will not be broadcasted or recorded (no

MediaSite recording will be available). Due to the nature of this learning activity, there will be no makeup opportunities provided.

Site	Time of Session	Session	Lecturer	Room number
East Lansing	8:00 – 9:50 am	Session 1 – EL House #1	Dr. Wang	E202
East Lansing	8:00 – 9:50 am	Session 1 – EL House #2	Dr. Wilkins	102 Conrad
East Lansing	10:00 – 11:50 am	Session 2 – EL House #3	Dr. Wang	E202
East Lansing	10:00 – 11:50 am	Session 2 – EL House #4	Dr. Wilkins	102 Conrad
DMC	10:00 – 11:50 am	One Session	Dr. Faner	G029
MUC	10:00 – 11:50 am	One Session	Dr. Ritchie	UC3 208

Opportunity for bonus points by taking a Pre-Test

The biochemistry faculty makes a continuous effort to improve the BMB course offerings in terms of breadth and depth of coverage. As a part of that effort, we would like to assess the knowledge that you are bringing to medical school on the basis of your prior (undergraduate) course work and on the basis of your preparation for the Medical College Admission Test (MCAT). For this purpose, we would like you to take a Pre-Test.

The Pre-Test will be available from noon until 11:59 pm on Monday, August 28, 2017 through the computer-based testing system (ExamSoft). It will contain 50 questions, covering topics in biochemistry, molecular biology, and genetics, to be completed in 100 minutes. You do not need to study for the test and your grade in this Course can only be enhanced by your participation.

Participation in the Pre-Test is entirely voluntary. However, you will have the opportunity to earn bonus points in the Course by taking the Pre-Test and achieving a good score:

On the Pre-Test, if you score	***You will get in BMB 515***
90-100%	3 bonus points
80- 89%	2 bonus points
70- 79%	1 bonus point
<70%	0 bonus point

Course Grades

A total of 126 points can be derived from the two exams, two quizzes, two homework assignments, and points from in-lecture i>Clicker questions (see table on page 8)

- **P-Pass**—means that credit is granted and that the student achieved a level of performance judged to be satisfactory by the instructor. To obtain a "P" grade for this course, a student must obtain 70% or a total of 88 points.
- **N-No Grade**—means that no credit is granted and that the student did not achieve a level of performance judged to be satisfactory by the instructor. A student who accumulates less than 88 points or an accumulated score below 70% will receive an "N" grade.
- **Remediation** - Since all of the courses in the MSUCOM curriculum are required, any student receiving an "N" grade, if eligible, will have the opportunity to remediate the course. Consistent with COM policy, the remediation opportunity for BMB 515 will be by examination. The Remediation Exam will consist of 60 questions, comprehensive for the course. Passing is 70%. Students failing the Remediation Exam will need to retake BMB 515, if eligible. Please refer to the remediation policy information provided in Section 2 of this syllabus for information on College requirements and eligibility determination.

Student Evaluation of the Course

We want your feedback on how to improve this course.

- Informal Feedback: Feel free to approach the Course Coordinator, Dr. Raquel Ritchie, or any of the other course faculty with your reactions and suggestions. Or write out your comments and email them to the Course Coordinator or Faculty. From time to time, we may also convene focus groups of students, as an additional way to elicit your opinions and suggestions.
- Formal Evaluation: In addition to the above, we ask every student in the class to complete formal on-line course evaluation upon conclusion of the course. Student course evaluations are highly recommended. Student feedback provides Course Coordinators with valuable information regarding their performance, the performance of their colleagues, and the quality of the course. The information gained from these evaluations is used to continuously improve future offerings of this course. Students can access the evaluation system at: http://kobiljak.msu.edu/Evaluation/UnitI_II.html Your participation in this important process is greatly appreciated.
- SIRS Evaluations – You are not required to complete the course evaluations available to you via SIRS. If you would like to opt out of the ability to evaluate this course using SIRS, login to sirsonline.msu.edu, click the link to the survey, then select button at the bottom that says "Decline to Participate."

Section 2 – Policies

Academic Honesty and Professionalism

http://www.com.msu.edu/Students/Policies_and_Programs/Med_Student_Rights_Responsibilities.htm

http://www.com.msu.edu/Students/Professional_Development/Code_of_Prof_Ethics.htm

Each individual student is responsible for their behavior and is expected to maintain standards of academic honesty and professionalism. If any instance of academic dishonesty (cheating, plagiarism, etc.) is discovered by an instructor, it is his or her responsibility to take appropriate action. Such action may include giving a failing grade to the student in the Elective and/or referring the student for judicial review and possible disciplinary action, which may include disciplinary suspension or dismissal from the College.

Attendance/Excused Absence

In accordance with the MSU All-University Policy on Attendance, MSUCOM does not have a regulation requiring class attendance. However, the College understands and supports the need and the right of the faculty to expect student attendance and participation in many curricular components with consequences if the student is not attending. In the spirit of professional behavior, MSUCOM students are expected to attend required class sessions (e.g., lectures, laboratories) and take all examinations during their originally scheduled times. If this is not possible, the student must obtain an excused absence. To obtain an excused absence, you need to make the following contact, as appropriate, prior to the scheduled administration of the examination(s).

Personal Emergencies:

To obtain an excused absence, complete the Excused Absence Request form found on the student portal.

A personal emergency is typically defined as the death of an immediate family member, serious illness, automobile accident and/or hospitalization. Situations including, but not limited to: failure to be on time, conflicting appointments and failure to provide proper identification will not be considered a personal emergency, and requests based upon these situations may be denied.

If an examination/assessment or other mandatory experience is missed due to medical reasons, a medical provider's written confirmation may be required before the request is considered.

Advance Notice of Absence Available

For advance notice absences, a student must submit his/her excused absence request at least one week in advance of the scheduled mandatory elective activity. Wedding, family celebrations, vacations, conferences, etc are not considered acceptable excuses. If an examination or other required experience is missed due to medical reasons, an attending physician's written confirmation will be required in order for the absence to be excused.

Conferences, Conventions, Meetings, College Sponsored Activities:
If a student wishes to attend a conference, convention, meeting, or college sponsored activity which will cause him or her to miss a mandatory class [session(s) and/or examination(s)], he or she must complete and submit an Excused Absence Request form at least two weeks prior to the expected absence period and provide a copy of the conference, convention, meeting or college sponsored activity announcement. Examination dates and mandatory class sessions will not routinely be changed for these activities.

Extended Absences:
MSUCOM will not excuse students for extended absences involving elective travel and medical mission work in another country. Approval of extended absences for unavoidable situations will be considered by Academic Programs osteomedap@hc.msu.edu n a case-by-case basis.

Computer-Based Testing

http://www.com.msu.edu/AP/preclerkship_program/preclerkship_curriculum/preclerkship_curriculum%20.htm

It is the responsibility of each and every student (including students restarting and overload students) to know and be in compliance with the MSUCOM policy regarding computer-based testing. It is possible that adjustments may need to be made to this policy, and students will be notified of those adjustments when necessary.

In addition, each and every student must possess his or her own electronic device that is compatible with the software program SoftTest, and ensure that it is fully functional and operational at the time of every computerized assessment.

If a student has difficulties with respect to their technology prior to an assessment, he or she can send an email to OsteoMedAP@hc.msu.edu (which is monitored during normal business hours) for a response within 24 hours of viewing or call the lead curriculum assistant for more urgent matters. Anyone who will be taking only PART of any Unit Exam in Semester 2 (i.e. overload or returning MS1 students) will use paper and Scantron, not CBT.

i>Clicker Policy

http://www.com.msu.edu/Students/Policies_and_Programs/iCLICKER_Policy.htm

You are expected to have your i>Clicker registered prior to the beginning of this class. You are responsible for bringing your i>Clicker to every class with you. Class will proceed as planned, even if you have forgotten to bring your i>Clicker with you. Paper completion of i>Clicker activities will not be accepted as a substitute for the i>Clicker response. Please make sure that your i>Clicker is always in working order.

As a matter of professionalism, please note that under no circumstances should you loan your i>Clicker to another student. Nor should you ever be in the possession of an i>Clicker other than your own.

Answering questions or checking in for attendance on behalf of another student by using his or her i>Clicker is considered to be an act of dishonesty and may result in dismissal from the college.

Remediation Policy

Remediation of an "N" grade will be governed by the MSUCOM Policy for Retention, Promotion and Graduation (relevant content found under Remediation section), (http://www.com.msu.edu/Students/Registrar/MSUCOM%20Remediation%20of%20N%20Grade%20Algorithm.pdf) and by the remediation section of each course syllabus.

It is the responsibility of each student in the Michigan State University College of Osteopathic Medicine to verify his/her eligibility, with the Office of Student Services, prior to the administration of the remediation examination/experience. Also, it is the student's responsibility to ask the course coordinator about the format and expectations of the remediation experience.

Students deemed eligible for remediation by the registrar will be informed by the registrar's office.

Semester 2 Course Remediation Exams

Individual course written Comprehensive Remediation Exams for the following Semester 2 courses **(BMB 515, BMB 527, MMG 531, MMG 532, OST 566, PHM 564, PSL 539)** will be held either on Friday, January 5, 2018 or Saturday, January 6, 2018 between the hours of 8 AM and 5 PM. Students will have 2 hours to complete an individual course remediation exam. Students affected will be notified of the exact date, time, and venue for their course specific exam.

Requests for Special Accommodations

Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at www.rcpd.msu.edu Once a student's eligibility for accommodation has been determined he/she may be issued a Verified Individualized Services and Accommodation ("VISA") form. Please present this VISA form to Cheryl Luick, luick@msu.edu, A-331 East Fee Hall at the start of the semester and/or two weeks prior to the accommodation date (test, project, labs, etc.). Requests received after this date will be honored whenever possible.

It is the responsibility of the student to submit or have submitted an updated version of their accommodations to Cheryl Luick each semester that a student plans to use their accommodations.

Please note: In the event of any unforeseen situations, the instructor(s) may make changes to any portion of the syllabus, within reason and without notice. If such a situation arises, the instructor(s) will inform you as soon as possible of the necessary adjustments/updates. It is the student's responsibility to make note of these adjustments/updates.

Addendum:

Reading assignments, and other homework (next page)

Course Schedule

The course schedule can be found on the Class of 2021, semester 2 page:
http://www.com.msu.edu/AP/preclerkship_program/preclerkship_syllabi/2021/sem2/index.htm

Reading assignments, and other homework

Date	#	Subject	Instructor	Required Readings and Other Assignments [W (Wilkins, 1st ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 7th ed); T (Turnpenny, Ellard, 14th ed); R (Rhoads, Bell, 4th ed)
8/28	1	Forces, Energy and the Concept of Equilibrium	Faner		(F) [Chapter 6: Bioenergetics and Oxidative Phosphorylation - from *"Overview"* through *"Adenosine Triphosphate as an Energy Carrier"*]
8/28		Tutorial #1: Amino acid	Wilkins	c.p. 14-18; c.p. 19-21, Problem set	(F) [Chapter 1: I. Overview through section II. Structure]
8/28	2	Proteins and enzyme activity part 1	Faner		(F) [Chapter 2: Protein Structure – from *"Overview"* through *"Peptide Bond Polarity"*]; [Chapter 2: Protein Structure – from *"Secondary Structure of Proteins"* through *"Chapter Summary"*]; [Chapter 5: Enzymes – all]; [Chapter 23: Metabolic Effects of Insulin and Glucagon – *"Structure of Insulin"*]
8/29	3	Proteins and enzyme activity part 2	Faner	c.p. 62-63; D2L: Problem Set MF-1	
8/29	4	pH regulation and blood buffering	Faner		(F) [Chapter 1: Amino Acids – from "*Acidic and Basic Properties*" through "*Chapter Summary*"]; (R) p. 451-457 [Chapter 24: Acid-Base Homeostasis – from *"Introduction"* through *"Lungs are the Second Line of Defense against Changes in pH"*]
8/30		Tutorial #2: Nucleotides	Wilkins	c.p. 22-25; c.p. 26-28, Problem set	(F) [Chapter 22: I. Overview – II. Nucleotide Structure]
8/30	5	Hemoglobin and gas transport	Faner	D2L: Problem Set MF-2	(F) [Chapter 3: Globular Proteins –all]; [Chapter 5: Enzymes – *Allosteric Enzymes"*]
8/31		Tutorial #3: Carbohydrates	Wilkins	c.p. 29-38; c.p. 39-41, Problem set	(F) [Chapter 7: I. Overview through II. Classification & Structure]
8/31	6	Water soluble vitamins	Wilkins		(F) [Chapter 28: I. Overview – X. Pantothenic Acid; Figure 28.29]
8/31	7	Overview of metabolism; carbohydrate digestion and absorption	Wilkins	c.p. 112-115, The Metabolic BIG PICTURE; (W) p. 31-35 [Chapter 2, Sections: Overview of Metabolism through Key Structures to be able to Draw and Recognize]	(F) [Chapter 8: I. Intro. To Metabolism – II. Metabolism Regulation; Chapter 26: I. Overview – II. Assessment; Chapter 27: I. Overview – III. Energy requirement in humans; Chapter 7: III. Dietary Carbohydrate Digestion though the end of the chapter.]
9/1	8	Glycogen metabolism -- QUIZ 1	Wilkins		(F) [Chapter 11: all]
9/1	9	Oxidation states	Wilkins	(W) p. 1-21, p. 22-30 [Chapter 1: all; Problem set at end of Chapter 1]	

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9/5	10	Glycolysis	Wilkins	(W) p. 31-64 [Chapter 2, all]; c.p. 150-160, Entry of other sugars into glycolysis,	(F) [Chapter 8: III. Glycolysis Overview through end of chapter; Chapter 6: VI. B. Membrane transport systems; Chapter 12: all]
9/5	11	PDH complex; TCA cycle	Wilkins	(W) p. 65-84 [Chapter 3, all]; c.p. 167-169, PDH complex Clinical Case,	(F) [Chapter 9: all]
9/6	12	TCA cycle (cont.); ETC	Wilkins	(W) p. 87-96 [Chapter 4, all]; c.p. 187-188, ETC Inhibitors ; c.p. 188, Inhibitors problem set; c.p. 189-193, ETC Clinical Cases I, II, & III,	(F) [Chapter 6: V. Electron Transport Chain – end of chapter]
9/6	13	Gluconeogenesis; Pentose phosphate pathway	Wilkins	(W) p. 99-121, 122-129 [Chapter 5, all; PPP problem set]; D2L Self-study Module: Gluconeogenesis; c.p. 199, Gluconeogenesis clinical case; (F) p. 316-317 [Chapter 23: IV. C. 4. Alcohol-related hypoglycemia]; D2L: Problem Set CW-1	(F) [Chapter 10: all; Chapter 13: all]
9/7	14	DNA and chromosome structure	Ritchie	D2L: Problem Set RR-1	(F) [Chapter 30: DNA Structure, Replication, and Repair - from "*Overview*" through "*DNA Structure*"]; [Chapter 30: DNA Structure, Replication, and Repair – "*Eukaryotic DNA Organization*"]; (T) p. 13-14 [Chapter 2: The Cellular and Molecular Basis of Inheritance – "*DNA: The Hereditary Material*" – from "*Composition*" through "*Structure*"]; 15-18 [from "*Chromosome Structure*" through "*Types of DNA Sequence*"]; 20-21 [and "The Genetic Code]
9/7	15	DNA replication	Ritchie		(F) [Chapter 30: DNA Structure, Replication, and Repair - from "*Steps in Prokaryotic DNA Replication*" through "*Eukaryotic DNA Replication*"]; (T) p. 14-15 [Chapter 2: The Cellular and Molecular Basis of Inheritance – "*DNA: The Hereditary Material*" – "*Replication*" only]
9/11		**UNIT EXAM 1 (covering sessions 1-15 and tutorials #1-3)**			
9/11	16	Chromosomes during mitosis and meiosis	Ritchie		(T) p. 3-5 [Chapter 1: The History and Impact of Genetics in Medicine – "*Gregor Mendel and the Laws of Inheritance*"]; 38-42 [Chapter 3: Chromosomes and Cell Division – from "*Cell Division*" through "*Gametogenesis*"]

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9/12	17	One-carbon metabolism	He	(F) [Chapter 20: Amino Acid Degradation and Synthesis - from "*Amino acids that form succinyl CoA: methionine"*up to "*Other amino acids that form succinyl Co-A*"]	(F) [Chapter 28: Vitamins - from "*Folic acid*" up to "*Ascorbic acid (vitamin C)*"]
9/12	18	Nucleotide synthesis and catabolism	He	D2L: Problem Set JH-1	(F) [Chapter 22: Nucleotide Metabolism - from "*Synthesis of purine nucleotides*" up to Fig. 22.24 "*Key concept map for nucleotide metabolism*"]
9/13	19	RNA transcription	Faner	c.p. 302-307	(F) [Chapter 31: RNA Structure, Synthesis, and Processing - All]; (T) p. 18-19 [Chapter 2: The Cellular and Molecular Basis of Inheritance – *"Transcription"*]
9/14	20	Protein translation	Ritchie		(F) [Chapter 32: Protein Synthesis – from "*Overview*" through "*Steps in Translation*"]; (T) p. 19-20 [Chapter 2: The Cellular and Molecular Basis of Inheritance – "*Translation*" – through "*Transfer RNA*"; and "*The Genetic Code*"]
9/14	21	Post-translational modification	Ritchie		(F) [Chapter 14: Glycosaminoglycans, Proteoglycans, and Glycoproteins – from "*Oligosaccharide Structure*" through "*Glycoproteins Synthesis*"]; [Chapter 19: Amino Acids: Nitrogen Disposal – "*Overall Nitrogen Metabolism*" – "*Protein Turnover*" only]; [Chapter 32: Protein Synthesis – "*Co- And Posttranslational Modifications*" only]
9/15	22	Gene expression	Ritchie	D2L: Problem Set RR-2	(F) [Chapter 33: Regulation of Gene Expression - All]; (R) p. 14-15 [Chapter 1: Homeostasis and Cellular Signaling - "*Molecular Basis of Cellular Signaling*" – "*Hormone receptors bind specific hormones to initiate cell signaling in the cells*" only] (Fig. 1.13)
9/18	23	Gene expression regulation –- QUIZ 2	Ritchie	c.p. 348-349	(F) Chapter 33: Regulation of Gene Expression - All]
9/18	24	The basis of molecular techniques	Faner		(F) [Chapter 34: Biotechnology and Human Disease – from *"Southern Blotting"* through *"Polymerase Chain Reaction"*]; (T) p. 59-60 [Chapter 4: DNA Technology and Applications – from *"Restriction Fragment Length Polymorphism"* through *"Amplification-Refractory Mutation System (ARMS)PCR"]*
9/19	25	Application of molecular techniques - Part 1	Faner		(T) p. 61-67 [Chapter 4: DNA Technology and Applications - from *"Sanger Sequencing"* through *"Variable Number Tandem Repeat"*]
9/19	26	Application of molecular techniques - Part 2	Faner	c.p. 394-399; D2L: Problem Set MF-3	(T) p. 71 [Chapter 4: DNA Technology and Applications – *"Diagnosis in Non-Genetic Disease"*]

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9/20	27	DNA repair	Faner		(F) [Chapter 30: DNA Structure, Replication, and Repair – *"DNA Repair"*]; [Chapter 32: Protein Synthesis – *"Consequences of Altering the Nucleotide Sequence"*]; (T) p. 22-28 [Chapter 2: The Cellular and Molecular Basis of Inheritance – from *"Mutations"* through *"Mutations and Mutagenesis*"]
9/20	28	Receptor to nucleus signaling cascades	Ritchie	(R) p. 10 [Chapter 1: Homeostasis and Cellular Signaling – "*Clinical Focus 1.2. Tyrosine Kinase Inhibitors for Chronic Myeloid Leukemia"]*; D2L: Problem Set RR-3	(F) [Chapter 23: Metabolic Effects of Insulin and Glucagon – "*Insulin*" – "*Mechanism*" only]; (R) p. 9-10 [Chapter 1: Homeostasis and Cellular Signaling – "*Molecular Basis of Cellular Signaling*" – through "*Plasma membrane receptors activate signal transduction pathways*"]; p. 12-14 [and "*Tyrosine kinase receptors signal through adapter proteins to activate the mitogen-activated protein kinase pathway*"]; p. 18 ["*Second Messenger roles*" - "*Lipids have important second messenger regulatory functions, including immune response mediation*"]; p. 21-23 [and "*Mitogenic Signaling Pathways*"] (Fig. 1.11 and 1.12)
9/21	29	Lipid overview; FA oxidation; KB synthesis	Wilkins	(W) p. 131-150 [Chapter 6, all]; c.p. 439, Dietary Issues and Clinical Problems regarding Impaired FAO, c.p. 444-446, Carnitine case study	(F) p. 181-182; 189-200 [Chapter 16: I. Overview – II. Fatty Acid Structure; Chapter 16: IV. Fat Mobilization – end of chapter]
9/21	30	FA synthesis	Wilkins	(W) p. 151-167 [Chapter 7, all]; c.p. 454-459, Review and Integration of Metabolic pathways; D2L: Problem Set CW-2	(F) p. 183-189 [Chapter 16: III. Fatty Acid De Novo synthesis]
9/22	CAS	Clinical Application: Clinical Case — Integration of metabolism	Site faculty	c.p. 460-463, Abnormalities in Hormonal Regulation & Its Effects on Metabolism	(F) p. 337-348 [Chapter 25: Diabetes Mellitus, all]
9/25		**UNIT EXAM 2 (covering sessions 1-30, Clinical Application and tutorials #1-3)**			