MICHIGAN STATE UNIVERSITY | College of Osteopathic Medicine

BMB 515 – Medical Biochemistry and Molecular Biology

Fall – 2016

Syllabus last updated: 08/04/16 by R.Ritchie

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Notice to Students: Although course syllabi at MSUCOM have a consistent format, vitally important details differ by course. For this reason, you must read the syllabus thoroughly at the onset of each course to know what the course will provide 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.
Phone:	586-263-6296
Email:	*rritchie@msu.edu*
Address:	117-4 UC-4, MUC - 44575 Garfield Road, Clinton Twp, MI 48038

Course Faculty
(Note - Preferred method of contact is in italics)

Name: Phone: Email: Site:	John Wang, Ph.D. 515-353-9542 *wangj@msu.edu* 402C Biochemistry, EL	Martha Faner, Ph.D. 313-578-9669 *fanermar@msu.edu* CG90, DMC	Raquel Ritchie, Ph.D. 586-263-6296 *rritchie@msu.edu* 117-4 UC4, MUC
Name: Phone: Email: Site:	Carol Wilkins, Ph.D. 515-353-4927 *mindockc@msu.edu* 502B Biochemistry, EL	Jin He, M.D., Ph.D. 517-353-0613 *hejin1@msu.edu* 116A Biochemistry, EL	

Curriculum Assistants

	EL	DMC	MUC
Name: Phone: Email:	Cheryl Luick 517-884-3880 luick@msu.edu	Katelyn Johnston 517-884-9628 appleto6@msu.edu	Beata Rodriguez - **LEAD** 586-263-6799 beata.rodriguez@hc.msu.edu

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.msu.edu/

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	Recommended	Required
▪ BMB 515 Course Pack ▪ Ferrier, D. Lippincott's Illustrated Reviews: Biochemistry, 6th ed. Wolters Kluwer/Lippincott, Williams & Wilkins, 2014. [ISBN: 978-1-45117-562-2] ▪ Wilkins, C. Understanding Biochemical Pathways: A Pattern Recognition Approach. Cognella Academic Publishing, 2017. [ISBN: 978-1-62131-250-5]	▪ 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]	▪ 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.

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.

i>Clicker Use in Course

i>Clickers will be used in this class. See **In-Lecture i>Clicker points** on page 8 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 courses, done well in them and are model students. The main purpose of this program is to improve students' grades and their overall learning ability.

Schedule for SI sessions:
Thursday, 9/1: 5:00-7:00pm (Prepare for Quiz1)
Friday, 9/2: 2:00-4:00pm (Review of the first week content)
Friday, 9/9: 4:00-6:00pm (Review of the second week content and Prepare for UE1)
Friday, 9/16: 2:00-4:00pm (Review of the third week content and Prepare for Quiz2)
Friday, 9/23: 4:00-6:00pm (Review of the fourth week content and Prepare for UE2)

Please make sure to check the BMB 515 D2L site under the "Supplemental Instruction" tab for updated information on SI schedule and room numbers for different sites.

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

In summary, the course faculty are here to facilitate your learning. The large number of students in this course (about 300) necessitates a degree of formality. Also, since your schedules are very full, we must adhere rigidly to the lecture, small group and lab times assigned to this course. However, within these constraints, the needs of individual students will be accommodated whenever possible. Please feel free to contact the Course Coordinator with any personal issues you may have involving this course.

Course begin and end dates

BMB 515 begins on August 29, 2016 and ends on December 5, 2016. See addendum for detailed daily

course schedule.

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., 9/02/16	**7**	Sessions 1 through 6 plus the 3 tutorials
Unit Exam 1 Mon., 9/12/16	**51**	Sessions 1 through 14, the 3 tutorials and the GNG self-study module
Quiz #2 Mon., 9/19/16	**7**	Sessions 15 through 22
Unit Exam 2 Mon., 09/26/16	**48**	Sessions 1 through 30, CAS, the 3 tutorials and the GNG self-study module
In-Lecture i>Clicker 8/29/16-9/23/16	**3**	Content from lecture(s) and CAS
Homework Assignment 1 9/26/16-10/5/16	**4**	Sessions 14 through 28
Homework Assignment 2 12/01/16-12/05/16	**5**	Sessions 1-30 and CAS; and OST 551 Week 14 EBM: Basic Science Cases and searching the literature
TOTAL POINTS	**125**	

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 26, 2016 until 11:30 pm Wednesday, October 5, 2016.**

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, December 1, 2016. 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 December 1, 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 five 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, December 1, 2016 until 11:30 pm Monday, December 5, 2016.**

In-Lecture i>Clicker points: Each student can potentially earn a maximum of 3 points (counting toward the 125 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 15 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 everyday 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 23, 2016 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
			EL House #2	Dr. Wilkins	102 Conrad
	10:00 – 11:50 am	Session 2	EL House #3	Dr. Wang	E202
			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

Course Grades
A total of 125 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 7)

- **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 87 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
  87 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 must 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. 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://com.msu.edu/Students/Professional_Development/Statement_on_Professionalism.htm

Every student is responsible for their behavior and is expected to adhere to all MSU and MSUCOM policies of academic honesty and professionalism. If there is any instance of academic dishonesty or unprofessionalism discovered by a member of the faculty, administration or staff, it is his or her responsibility to take appropriate action.

Such action may include, but is not limited to: giving a failing grade, referring a student for judicial review, directing the student to the Associate Dean of Student Services, and any other actions outlined in the Medical Students' Rights and Responsibilities document.

http://com.msu.edu/AP/Professionalism/MSRR-Offical-Document-Final.pdf

Absences from Mandatory Class Sessions, Examinations, Assessments and Activities

MSUCOM students are expected to attend all mandatory class sessions (e.g., lectures, laboratories, group activities) and take all examinations/assessments during their originally scheduled times. If this is not possible an excused absence may be requested.

Excused absences will not be given to all who make a request. If a request for an excused absence is denied, the student will receive a zero (0) grade for the mandatory session or examination/assessment in question, which may result in the issuance of an "N" grade in the course.

An excused absence does not relieve the student from responsibilities for missed mandatory class sessions and examinations. It is highly possible that an excused absence will not be granted for a mandatory class session due to scheduling of equipment and faculty. If one of these mandatory sessions is missed, even though an excused absence is granted, and cannot be made up, the student will receive a zero(0) grade for the event and may be required to repeat the course at its next offering.

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:
A student must submit his or her excused absence via the Excused Absence Form at least one week in advance of any scheduled mandatory class session or examination/assessment. Requests for excused absences regarding weddings, family celebrations and vacations will be denied.

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 on 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 Thursday, January 5, 2017 or Friday, January 6, 2017 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 http://www.rcpd.msu.edu/ . Once your eligibility for an accommodation has been determined, you may be issued a Verified Individualized Services and Accommodation (VISA) form. Please present the VISA to Cheryl Luick, luick@msu.edu A329 East Fee Hall at the start of the term and/or two weeks prior to the assessment event (test, project, labs, etc.). Requests received after this date will be honored whenever possible.

It is the responsibility of the Student with Accommodations to contact the Course Coordinator and the Curriculum Assistant two weeks prior to the beginning of the semester, when the VISA is obtained prior to the start of the semester. When the VISA is obtained after the start of a semester, the student will notify the Course Coordinator and the Curriculum Assistant two weeks prior to the next scheduled

evaluation.

<u>Please note:</u> 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: Course Schedule on the next page

Fall 2016 BMB 515: SCHEDULE

Day	Date	Time	Session	Lecture Topic/Title	Lecturer	Origination
Mo	8/29	11 AM	1	Forces, Energy and the Concept of Equilibrium	Faner	DMC
Tu	8/30	8	Tutorial 1	Amino acids	Wilkins	Online
Tu	8/30	10	2	Proteins and enzyme activity part 1	Faner	DMC
Tu	8/30	11	3	Proteins and enzyme activity part 2	Faner	DMC
We	8/31	8	Tutorial 2	Nucleotides	Wilkins	Online
We	8/31	10	4	pH regulation and blood buffering	Faner	DMC
We	8/31	11	5	Hemoglobin and gas transport	Faner	DMC
Th	9/1	8	Tutorial 3	Carbohydrates	Wilkins	Online
Th	9/1	10	6	Oxidation States	Wilkins	EL
Th	9/1	11	7	Water soluble vitamins	Wilkins	EL
Quiz #1: Friday, 9/2 at 8 AM (sessions 1-6 and tutorials 1-3)						
Fr	9/2	8	8	Overview of metabolism; carbohydrate digestion and absorption	Wilkins	EL
Fr	9/2	9	9	Glycolysis	Wilkins	EL
Tu	9/6	10	10	GNG; PDH complex; TCA cycle	Wilkins	EL
We	9/7	10	11	TCA cycle (cont.); ETC	Wilkins	EL
We	9/7	11	12	Glycogen metabolism	Wilkins	EL
Th	9/8	10	13	Pentose Phosphate Pathway	Wilkins	EL
Th	9/8	11	14	DNA and chromosome structure	Ritchie	MUC
UNIT EXAM 1: Monday, 9/12 7:45 AM – 10:45 AM (sessions 1-14 and tutorials 1-3)						
Tu	9/13	10	15	DNA replication	Ritchie	MUC
Tu	9/13	11	16	Chromosomes during mitosis and meiosis	Ritchie	MUC
We	9/14	10	17	One-carbon metabolism	He	EL
We	9/14	11	18	Nucleotide synthesis and catabolism	He	EL
Th	9/15	10	19	RNA transcription	Faner	DMC
Th	9/15	11	20	Protein translation	Ritchie	MUC
Fr	9/16	10	21	Post-translational modification	Ritchie	MUC
Fr	9/16	11	22	Gene expression	Ritchie	MUC
Quiz #2: Monday, 9/19 at 8 AM (sessions 15-22)						
Mo	9/19	8	23	Gene expression regulation	Ritchie	MUC
Mo	9/19	9	24	The basis of molecular techniques	Faner	DMC
Tu	9/20	8	25	Application of molecular techniques - Part 1	Faner	DMC
Tu	9/20	9	26	Application of molecular techniques - Part 2	Faner	DMC
We	9/21	10	27	DNA repair	Faner	DMC
We	9/21	11	28	Receptor to nucleus signaling cascades	Ritchie	MUC
Th	9/22	8	29	Lipid overview; FA oxidation; KB synthesis	Wilkins	EL
Th	9/22	9	30	FA synthesis	Wilkins	EL
Fr	9/23	8-9:50 or 10-11:50	Clinical Application	Clinical Case: Integration of Metabolism	Site Faculty	Local
UNIT EXAM 2: Monday, 9/26 7:45 AM – 10:45 AM (sessions 1-30, Clinical Application and tutorials 1-3)						

Fall, 2016 BMB 515 (BIOCHEMISTRY) Lecture schedule, reading assignments, and other homework

Date	#	Subject	Instructor	Required Readings and Other Assignments [W (Wilkins, preview ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 6th ed); T (Turnpenny, Ellard, 14th ed); R (Rhoads, Bell, 4th ed)
8/29	1	Forces, Energy and the Concept of Equilibrium	Faner		(F) p. 69-73 [Chapter 6: Bioenergetics and Oxidative Phosphorylation - from *"Overview"* through *"Adenosine Triphosphate as an Energy Carrier"*]
8/30		Tutorial #1: Amino acid	Wilkins	c.p. 14-18; Problem set c.p. 19-21	(F) p. 1-5 [Chapter 1: I. Overview through section II. Structure]
8/30	2	Proteins and enzyme activity part 1	Faner		(F) p. 13-14 [Chapter 2: Structure of Proteins – from *"Overview"* through *"Polarity of the Peptide Bond"*]; 16-23 [Chapter 2: Structure of Proteins – from *"Secondary Structure of Proteins"* through *"Chapter Summary"*]; 53-67 [Chapter 5: Enzymes – all]; 308 [Chapter 23: Metabolic Effects of Insulin and Glucagon – *"Structure of Insulin"*]
8/30	3	Proteins and enzyme activity part 2	Faner	c.p. 62-63; D2L: Problem Set MF-1	
8/31		Tutorial #2: Nucleotides	Wilkins	c.p. 22-25; Problem set c.p. 26-28	(F) p. 291-292 [Chapter 22: I. Overview – II. Nucleotide Structure]
8/31	4	pH regulation and blood buffering	Faner		(F) p. 6-12 [Chapter 1: Amino Acids – all]; (R) p. 451-457 [Chapter 24: Acid-Base Homeostasis – from *"Introduction"* through *"Lungs are the Second Line of Defense against Changes in pH"*]
8/31	5	Hemoglobin and gas transport	Faner	D2L: Problem Set MF-2	(F) p. 25-42 [Chapter 3: Globular Proteins – all]; 62-63 [Chapter 5: Enzymes – *Regulation of Allosteric Enzymes"*]
9/1		Tutorial #3: Carbohydrates	Wilkins	c.p. 29-38; Problem set c.p. 39-41	(F) p. 83-86 [Chapter 7: I. Overview through II. Classification & Structure]
9/1	6	Oxidation states	Wilkins	(W) Chapter 1; Problem set at end of Chapter 1	
9/1	7	Water soluble vitamins	Wilkins		(F) p. 373-381; 392-394 [Chapter 28: I. Overview – X. Pantothenic Acid; Figure 28.29]
9/2	8	Overview of metabolism; carbohydrate digestion and absorption -- QUIZ #1	Wilkins	The Metabolic BIG PICTURE, c.p. 113-116	(F) p. 91-96; 349-360; p. 86-90 [Chapter 8: I. Intro. To Metabolism – II. Regulation of Metabolism; Chapter 26: all; Chapter 27: I. Overview – III. Energy requirement in humans; Chapter 7: III. Digestion of Dietary Carbohydrates though the end of the chapter.]
9/2	9	Glycolysis	Wilkins	(W) Chapter 2; Entry of other sugars into glycolysis, c.p. 124-133	(F) p. 96-108; 79-80; 137-144 [Chapter 8: III. Overview of glycolysis – to end of chapter; Chapter 6: VI. B. Membrane transport systems; Chapter 12: all]

Date	#	Subject	Instructor	Required Readings and Other Assignments [W (Wilkins, preview ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 6th ed); T (Turnpenny, Ellard, 14th ed); R (Rhoads, Bell, 4th ed)
9/6	10	Gluconeogenesis; PDH complex; TCA cycle	Wilkins	(W) Chapter 3, all; Gluconeogenesis c.p. 134-139; D2L Self-study Module: Gluconeogenesis; (F) p. 317-318 IV. C. 4. Alcohol-related hypoglycemia; PDH complex Clinical Case, c.p. 141-143	(F) p. 117-124; p. 109-116 [Chapter 10: all; Chapter 9: all]
9/7	11	TCA cycle (cont.); ETC	Wilkins	Inhibitors problem set c.p. 157; ETC Clinical Cases I, II, & III, c.p. 158-162	(F) p. 73-82 [Chapter 6: V. Electron Transport Chain – end of chapter]
9/7	12	Glycogen metabolism	Wilkins		(F) 125-136 [Chaper 11: all]
9/8	13	Pentose phosphate pathway	Wilkins	PPP problem set c.p. 186-193; D2L: Problem Set CW-1	(F) 145-156 [Chapter 13: all]
9/8	14	DNA and chromosome structure	Ritchie	D2L: Problem Set RR-1	(F) p. 395-398 [Chapter 29: DNA Structure, Replication, and Repair - from "*Overview*" through "*Structure of DNA*"]; 409-410 [Chapter 29: DNA Structure, Replication, and Repair – "*Organization of Eukaryotic DNA"*] (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]
SEPTEMBER 12, 2016 – UNIT EXAM 1 (covering sessions 1-14 and tutorials #1-3)					
9/13	15	DNA replication	Ritchie		(F) p. 399-409 [Chapter 29: DNA Structure, Replication, and Repair - from "*Steps in Prokaryotic DNA Synthesis*" through "*Eukaryotic DNA Replication*"]; (T) p. 14-15 [Chapter 2: The Cellular and Molecular Basis of Inheritance – "*DNA: The Hereditary Material*" – "*Replication*" only]
9/13	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*"]
9/14	17	One-carbon metabolism	He	(F) p. 263-265 [Chapter 20, from "*Amino acids that form succinyl CoA: methionine"*up to "*Other amino acids that form succinyl Co-A*"]	(F) p. 374-377 [Chapter 28, from "*Folic acid*" up to "*Ascorbic acid (vitamin C)*"]
9/14	18	Nucleotide synthesis and catabolism	He	D2L: Problem Set JH-1	(F) p. 292-304 [Chapter 22, from "*Synthesis of purine nucleotides*" up to Fig. 22.24 "*Key concept map for nucleotide metabolism*"]

Date	#	Subject	Instructor	Required Readings and Other Assignments [W (Wilkins, preview ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier; 6th ed); T (Turnpenny, Ellard, 14th ed); R (Rhoads, Bell, 4th ed)
9/15	19	RNA transcription	Faner	c.p. 287-292	(F) p. 417-427 [Chapter 30: RNA Structure, Synthesis, and Processing - All]; (T) p. 18-19 [Chapter 2: The Cellular and Molecular Basis of Inheritance – *"Transcription"*]
9/15	20	Protein translation	Ritchie		(F) p. 431-443 [Chapter 31: Protein Synthesis – from "*Overview*" through "*Steps in Protein Synthesis*"]; (T) p. 19-20 [Chapter 2: The Cellular and Molecular Basis of Inheritance – "*Translation*" – through "*Transfer RNA*"; and "*The Genetic Code*"]
9/16	21	Post-translational modification	Ritchie		(F) p. 165-169 [Chapter 14: Glycosaminoglycans, Proteoglycans, and Glycoproteins – from "*Oligosaccharide Structure*" through "*Synthesis of Glycoproteins*"]; 246-247 [Chapter 19: Amino Acids: Disposal of Nitrogen – "*Overall Nitrogen Metabolism*" – "*Protein Turnover*" only]; 443-444 [Chapter 31: Protein Synthesis – "*Co- And Posttranslational Modification of Polypeptide Chains*" only]
9/16	22	Gene expression	Ritchie	D2L: Problem Set RR-2	(F) p. 449-461 [Chapter 32: 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)
9/19	23	Gene expression regulation – QUIZ 2	Ritchie	c.p. 333-334	(F) p. 449-461[Chapter 32: Regulation of Gene Expression - All]
9/19	24	The basis of molecular techniques	Faner		(F) p. 473-482 [Chapter 33: 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"]*
9/20	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"*]
9/20	26	Application of molecular techniques - Part 2	Faner	c.p. 451-456; D2L: Problem Set MF-3	(T) p. 71 [Chapter 4: DNA Technology and Applications – *"Diagnosis in Non-Genetic Disease"*]

Date	#	Subject	Instructor	Required Readings and Other Assignments [W (Wilkins, preview ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier; 6th ed); T (Turnpenny, Ellard, 14th ed); R (Rhoads, Bell, 4th ed)
9/21	27	DNA repair	Faner		(F) p. 410-413 [Chapter 29: DNA Structure, Replication, and Repair – *"DNA Repair"*]; 433-434 [Chapter 31: 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*"]
9/21	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) p. 311-313 [Chapter 23: Metabolic Effects of Insulin and Glucagon – "*Insulin*" – "*Mechanism of Insulin Action*" 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)
9/22	29	Lipid overview; FA oxidation; KB synthesis	Wilkins	(W) Chapter 4; Carnitine case study, c.p. 417-419	(F) p. 181-182; 189-200 [Chapter 16: I. Overview – II. Structure of fatty acids; Chapter 16: IV. Mobilization of stored fats – end of chapter]
9/22	30	FA synthesis	Wilkins	(W) Chapter 5; Review and Integration of Metabolic pathways, c.p. 421-427; D2L: Problem Set CW-2	(F) p. 183-189 [Chapter 16: all of III. De novo syn. of FAs]
9/23	CAS	Clinical Application: Clinical Case—Integration of metabolism	Site faculty	c.p. 428-431	(F) p. 337-347 [Chapter 25: Diabetes Mellitus - all]
SEPTEMBER 26, 2016 – UNIT EXAM 2 (covering sessions 1-30, Clinical Application and tutorials #1-3)					