

**BMB 516 – Metabolic Biochemistry: Nutrients and Products**

Summer Semester 1 - 2020

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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 516 is a 1 credit hour course.

BMB 516 provides students with a description of some of the major nutrients and products of energy metabolism 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 description of major nutrients and products of energy metabolism 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.

### College Program Objectives

In addition to the above course-specific goals and learning objectives, this preclerkship course also facilitates student progress in attaining the College Program Objectives. Please refer to the complete list provided on the [MSUCOM Overview of Program](#).

### 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](mailto:rritchie@msu.edu) (preferred method)

Address: 117-4 UC-4, MUC - 44575 Garfield Road, Clinton Twp., MI 48038

### Course Faculty

Name	Email	Phone	Site
Martha Faner, Ph.D.	<a href="mailto:fanermar@msu.edu">fanermar@msu.edu</a>	313-578-9669	DMC
Jin He, M.D., Ph.D.	<a href="mailto:Hejin1@msu.edu">Hejin1@msu.edu</a>	517-353-0613	EL
Carol Restini, Pharm.D., Ph.D.	<a href="mailto:restinic@msu.edu">restinic@msu.edu</a>	313-578-9646 (DMC)	DMC/MUC

Name	Email	Phone	Site
		586-263-6757 (MUC)	
Raquel Ritchie, Ph.D.	<a href="mailto:rritchie@msu.edu">rritchie@msu.edu</a>	586-263-6296	MUC
John Wang, Ph.D.	<a href="mailto:wangj@msu.edu">wangj@msu.edu</a>	515-353-9542	EL
Carol Wilkins, Ph.D.	<a href="mailto:mindockc@msu.edu">mindockc@msu.edu</a>	515-353-0613	EL

### Curriculum Assistants

Site	Name	Email	Phone
East Lansing	Robin Borowski	<a href="mailto:chambe27@msu.edu">chambe27@msu.edu</a>	517-353-9515
DMC	Smita Deb	<a href="mailto:debsmita@msu.edu">debsmita@msu.edu</a>	313-578-9628
MUC	Beata Rodriguez - LEAD	<a href="mailto:rodri583@msu.edu">rodri583@msu.edu</a>	586-263-6799

### Lines of Communication

- For administrative aspects of the Course: contact the course coordinator.
- For content questions relating to a specific lecture or topic: contact the faculty presenter for that specific portion of the course or your on-site instructor.
- For absences and missed exams, see policy on Absences from Mandatory Class Sessions and Examinations/Assessments below.  
Requests for an excused absence must be submitted via the [student portal](#).
- Please set your notifications in D2L to immediate to receive posted News announcements. You may choose to receive notifications by email or SMS.

### 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](mailto:rritchie@msu.edu). The Course Coordinator is generally available by appointment.

### Course Web Site

The URL for the Course website is: <https://d2l.msu.edu>

The course D2L site has these PERTINENT sections:

- **Announcements** - 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, 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

- 2020 BMB 516 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

- Rhoades, R. and Bell, D. Medical Physiology: Principles of Clinical Medicine, 5th ed. Wolters Kluwer, 2018. [ISBN: 978-1-49631-046-0]

### 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.** Your success in some of the lectures/activities will depend on you coming prepared. Therefore, it is important that you complete any preparatory readings prior to the lecture/activity to which they are assigned.
- **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 gluconeogenesis self-study module, 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 at the end of the syllabus.

**Opportunities to confirm your understanding:**

Problem sets and their answers will be provided on the course D2L site. 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 516 portion of Unit Exam 4 and one for Unit Exam 10, will be available for you to take using computer-based testing (Examplify). Information on when the practice exams will be available and how to access them will be posted in the course D2L site and/or will be sent via email.

**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 (check D2L for more information):**

SI Session Date	Time
Tuesday, 6-30-20	5-7 pm
Friday, 7-10-20	4-6 pm
Tuesday, 8-4-20	5-7 pm

## Course-based Academic Support

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.

Additional academic support resources can be accessed here: [MSUCOM Office of Academic Success and Career Planning](#).

## Courses begin and end dates

BMB 516 begins on June 16, 2020 and ends on August 20, 2020 [**NOTE:** grades will be submitted on or before August 22, 2020 at 4 pm]. See addendum for detailed daily course schedule.

## Exams/Assessments

The successful achievement of learning objectives will require knowledge and skills acquired in other portions of the overall MSUCOM educational program. Students will be expected to apply concepts and vocabulary learned in other courses to problem-solving for exams/assessments in this course.

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 readings, problem sets, etc.). Student attainment of these objectives will be evaluated using two exams, three quizzes and assessments associated with the Activity sessions (see Table below).

In order to maintain security of assessments, you may NOT post questions on the discussion board regarding exam questions or quiz questions. Kindly email your questions to the course coordinator.

Assessments	Projected Points	Material to be Covered
<b>Quiz 1</b> Tue., 06/23/20	5	Sessions 1 through 3 + required readings
<b>Quiz 2</b> Tue., 07/07/20	5	Sessions 1 through 8 + required readings
<b>Unit Exam 4</b> Wed., 07/15/20	33	Sessions 1 through 11 + required readings
<b>Quiz 3</b> Thu., 07/30/20	5	Sessions 1 through 13 + required readings

<b>Unit Exam 10</b> Thu., 08/20/20	33	Sessions 1 through 17 + required readings
<b>Points from Activities</b>	7	Content related to Activity and all sessions and required readings prior to the Activity
<b>TOTAL POINTS</b>	88	

**Quizzes:**

Each quiz will contain 5 questions, to be completed in 8 minutes immediately after the last session on the dates stated in Table above. Please read and carefully follow the directions detailed below.

1. The quizzes will be administered using your personal computer-based testing device. You must ensure that this device is properly charged.
2. Ensure that you have Exemplify installed in your personal computer-based testing device.
3. You must DOWNLOAD the quiz to your personal computer-based testing device by 10 am on the day of the quiz. It will be available for downloading 24 hours prior to the quiz.
4. On the day of the quiz, the lecturer will explicitly announce the end of the session and display the PASSCODE for the quiz. Immediately, you must:
  - a. Copy down the PASSCODE, which will be displayed for THREE minutes.
  - b. Get Exemplify up and running on your personal computer-based testing device.
  - c. Put away all your books, notes and papers, etc.
5. Exemplify will automatically allow you 8 minutes to take the quiz
6. Absences:
  - a. If a student is not in attendance at the session when the passcode is provided, he/she will be considered absent from the quiz.
  - b. Students who are absent may request an excused absence as defined by the Excused Absence Policy and related procedures.
  - c. If an excused absence is granted, the student will be permitted to take a make-up quiz at a date, time, and in a format determined by the course coordinator.
  - d. If an excused absence is not granted, the student will be permitted to take a make-up quiz but with a penalty as defined below.
    - i. On the first unexcused absence, there will be a 20% deduction in the quiz score.
    - ii. Any further unexcused absences from a quiz will result in a score of zero for the quiz.

**Activity Sessions:**

There will be three Activity sessions in BMB 516 (see schedule) for which attendance is **mandatory**. These sessions will not be recorded (no MediaSite recording will be available).

Attendance will be determined by Zoom and, for some of the activities, by REEF polling throughout the session. You will be expected to join the Zoom meeting on time and to stay for the duration of the assigned activity. You must participate in all REEF polling in order to be eligible to earn the points associated with a particular session. No make-up experiences will be provided should your device not work.

Activity	Total Possible Points
Low energy	2
What should be in the differential?	3
Abnormalities in hormonal regulation	2
TOTAL ACTIVITY POINTS	7

### Self-Direct Learning Opportunities

It is a goal at MSUCOM to promote self-directed learning to help our students grow into strong, self-directed future clinicians. Self-directed learning is also required by medical school accreditation standards. Self-directed learning is a 4-step process that occurs within an encapsulated timeframe. This will take shape in BMB 516 through the gluconeogenesis (GNG) self-study module (D2L) and the mandatory activity sessions, which unfold as follows:

1. **Self-Assessment of Learning Needs** – Students are provided with a curricular topic, a set of related learning objectives, and related learning materials or prompts. Students are encouraged to reflect on their initial learning needs related to the learning objectives and to engage with learning materials accordingly.
2. **Identification, Analysis, & Synthesis of Information** – In anticipation of formative/summative assessment activities related to the topic and learning objectives in a related online module or live session, students are encouraged to reflect on their knowledge and ability to meet learning objectives following engagement with learning materials. Should students find that a learning need, such as a gap or desire for clarification persists, they are encouraged to re-engage with learning materials, seek out additional learning resources such as reputable and/or peer-reviewed web content, and engage with their peers and faculty for clarification as necessary.
3. **Appraisal of Information Credibility** – Once students have assessed and synthesized their independent learning, they have the opportunity to appraise and apply their knowledge in an online module or live sessions via formative/summative assessment. Typically, REEF polling is the tool faculty use to gauge student learning, providing clarifying notes based on responses as necessary. Additionally, live sessions include application activities that often make use of case scenarios, to allow students to further appraise and apply knowledge within the context of peer collaboration.



4. **Feedback on Information-Seeking Skills** – Faculty facilitators will aid in providing feedback to students in terms of responses and clinical reasoning/information seeking processes through probing questions, prompts for reflection, and prompts for elaboration among other strategies following both the formative/summative assessment and the application activities.

## Course Grades

A student's course grade is determined by the following formula:

$$\begin{aligned} & (\text{BMB 516 portion of Unit Exam 4} + \text{BMB 516 portion of Unit Exam 10} + \text{Sum of Activity} \\ & \quad \text{Points}) / (88) \times 100\% \\ & = \text{Final Percent Score} \end{aligned}$$

- **P-Pass**—means that you have achieved a satisfactory level of performance and will receive credit for this course. To obtain a “P” grade for this course, you must earn a final percent score of 70% or a final point total of 61.
- **N-No Grade**—means that you have not achieved a satisfactory level of performance and no credit will be granted for this course. If you earn a final percent score below 70% or a final point total of less than 61, you will receive an “N” grade.
- **Remediation** – If you receive an “N” grade and meet the criteria below, you will be eligible to attempt remediation:
  - Earn a final percent score in the course of 60% or greater.

The remediation opportunity for this course will be by examination. It will consist of 50 questions, comprehensive for the course. Passing is 70%. Students failing the Remediation Exam will need to retake BMB 516, if eligible.

All remediation exams for semester 1 are scheduled for 8/25/2020-8/26/2020. Refer to the remediation policy information provided in Section 2 of this syllabus for more information.

## 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.
- **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 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: [MSUCOM Pre-clerkship Evaluation System](#).

## Section 2 – Policies

Please refer to the [MSUCOM Student Handbook](#) for these and other policies.

### Academic Honesty and Professionalism

Every student is responsible for their behavior and is expected to adhere to all MSU and MSUCOM policies of academic honesty and professionalism, as outlined in the MSUCOM Student Handbook and the MSU Medical Student Rights and Responsibilities. These documents may be found on the MSUCOM website. Additional guidance on academic integrity may be found on the MSU Ombudsperson's website at <https://ombud.msu.edu/sites/default/files/content/Academic-Integrity-at-MSU-updated-August-2017.pdf>

Incidents of academic dishonesty or professional misconduct will be addressed by the faculty, administration, or staff; 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 Medical Education, evaluation by the Committee on Student Evaluation, and other actions outlined in the Medical Student Rights and Responsibilities document.

### Types of Class Sessions

MSUCOM designates lectures and other class sessions by their delivery method. While additional terms may be used in a specific course, the following will provide general guidance to the type of session:

- Live or livestream lecture:
- Online Lecture:
- Webinar:
- Lab:

### Changes to Course Schedule or Requirements

Due to external circumstances, the course requirements published in the course syllabus and/or course schedule may be subject to change. Timely notification Communication regarding changes will be provided to enrolled students via the course D2L site and/or email. Any changes made will consider the MSU Code of Teaching Responsibility and the MSU Medical Students Rights and Responsibilities.

### Mandatory and Optional Class Sessions

All lectures and other class sessions are considered to be integral to the course, and students are expected to attend, view, or participate in each session. Some sessions are designated as "mandatory" in that attendance at the session on the scheduled date and time is required. Depending on the course, a student may earn points for attending or participating in a mandatory session or may lose points for failing to attend or participate. Availability of make-up points for missed sessions is at the discretion of the course coordinator. Optional class sessions are offered by faculty to assist students in learning or reviewing course content.

## **Absences from Mandatory Class Sessions and Examinations/Assessments**

It is the responsibility of the student to know which class sessions are deemed as mandatory and comply with the MSUCOM policy regarding absences from mandatory sessions and examinations. This policy may be found in the MSUCOM Student Handbook on the MSUCOM website. Requests for an excused absence must be submitted via the [student portal](#).

## **Computer-Based Testing**

It is the responsibility of each student to know and comply with the MSUCOM policy on computer-based testing. This policy may be found in the MSUCOM Student Handbook on the MSUCOM website.

Administration of quizzes, examinations, and other assessments may be self-proctored, virtual proctored, or classroom proctored. Regardless of the proctoring method, you are expected to take the exam in a quiet, private setting. Just like in a proctored exam, you are not to access notes, textbooks, references, your phone, or other materials, and you are not to interact with fellow students or others. Remember that integrity is defined as what you do when no one is looking.

You are also expected to not record, photograph, take screen shots, make notes of, or otherwise attempt to make a copy of any exam item for any purpose, including your personal use. A student who is discovered to have cheated or breached exam security will be subject to formal disciplinary action, up to and including dismissal from MSUCOM.

If you have concerns or evidence of an exam security breach on this or any exam, you may report that to an MSUCOM administrator or through the online concern form.

## **Medical Student Rights and Responsibilities**

If problem arise between instructor and student, both should attempt to resolve them by informal, direct discussions. If the problems remain unsolved, the Associate Dean for Medical Education and/or the MSU Ombudsperson may be consulted. The MSU Medical Student Rights and Responsibilities (MSRR) document defines processes for additional steps, including submission of a formal grievance. The MSSR may be found in the MSUCOM Student Handbook and online at [splife.studentlife.msu.edu](http://splife.studentlife.msu.edu)

## **REEF Polling (iClicker Cloud) Policy**

It is your responsibility to know and be in compliance with the Reef Polling (iClicker Cloud) Policy. This policy may be found in the MSUCOM Student Handbook. If you forget your device or if it does not work, for whatever reason, no make-up experiences will be provided, and no points will be given.

If Reef Polling is used to take attendance for an on-campus event, you will be expected to arrive to the physical location on time and to stay for the duration of the assigned activity. If Reef Polling is used to take attendance for an online event, you will be expected to start the session at the scheduled time and participate for the duration of the assigned activity.

As a matter of professionalism, please note that under no circumstances should you provide access to their iClicker Reef account to another student by sharing your device and/or account login, nor should a you accept another student's device or login credentials to access Reef Polling on their behalf. Answering questions or checking in for attendance on behalf of another student by using their device or

account is considered to be academic dishonesty and may result in disciplinary action up to and including dismissal from the college.

## **Remediation**

The MSUCOM Policy for Retention, Promotion and Graduation requires successful completion of each required course to progress in the curriculum. If you receive an “N” grade in a course, that grade will be recorded on your official transcript; you must meet the course requirement by successfully remediating or repeating the course.

Eligibility to attempt remediation of the course is determined by criteria described in the “Course Grades” section of the syllabus. If you are not eligible to attempt remediation, or if you fail the remediation, you must retake the course, provided you are eligible to continue in the program as determined by the Committee on Student Evaluation.

## **Student Safety and Well-being**

The MSUCOM website and Student Handbook provide information on student safety, campus security, access to medical care and counseling services, and to policies on injuries and exposures. If you have an injury or acute illness on campus, an incident report should be completed. The form is available on the MSUCOM intranet or from Academic Programs.

## **Requests for 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 (RCPD) at 517-884-7273 or online at [rcpd.msu.edu](http://rcpd.msu.edu). Once eligibility for an accommodation has been determined, you may be issued a Verified Individualized Services and Accommodation (VISA) form. Each VISA includes an expiration date; to request an accommodation, you must have an active VISA. You may work with RCPD to renew a VISA.

During the preclerkship curriculum, the college will help to coordinate accommodations for additional testing time. Provide your VISA to Nancy Thoma, [thoman@msu.edu](mailto:thoman@msu.edu), A333 East Fee Hall at the start of the term and/or at least two weeks prior to the assessment event (test, project, labs, etc.). Requests for accommodations received with less notice will be honored whenever possible. You may choose whether or not you wish to use accommodations for a particular event. For other accommodations, you may also review your VISA with the course coordinator and curriculum assistant assigned to that course.

## **Title IX Notifications**

Michigan State University is committed to fostering a culture of caring and respect that is free of relationship violence and sexual misconduct, and to ensuring that all affected individuals have access to services. For information on reporting options, confidential advocacy and support resources, university policies and procedures, or how to make a difference on campus, visit the Title IX website at [titleix.msu.edu](http://titleix.msu.edu).

Limits to confidentiality. Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, may not be able to maintain confidentiality when it conflicts with their responsibility to report certain issues to protect the health and safety of MSU community members and others. Instructors must report the following information to other University offices (including the Department of Police and Public Safety):

- Suspected child abuse/neglect, even if this maltreatment happened when you were a child;
- Allegations of sexual assault, relationship violence, stalking, or sexual harassment; and
- Credible threats of harm to oneself or to others.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In almost all cases, it will be your decision whether you wish to speak with that individual. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the MSU Counseling and Psychiatric Services.

**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:**

### **Course Schedule**

Course schedule for the current semester will be posted to D2L. Changes to the course schedule will be noted on the class academic calendar ("Google calendar") and communicated to students via D2L and/or email. The schedule for the most recent offering of this course will be posted on the MSUCOM website under Current Students/Preclerkship Curriculum.

### **Reading assignments, and other homework (next page)**

## Summer 2020 BMB 516 Reading assignments, and other homework

Date ( <u>Complete by date</u> )	#	Subject	Instructor	Required Preparatory Readings W (Wilkins, 1 <sup>st</sup> ed); F (Ferrier, 7 <sup>th</sup> ed)	Required Readings and Other Assignments [W (Wilkins, 1 <sup>st</sup> ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 7 <sup>th</sup> ed); R (Rhoads, Bell, 5 <sup>th</sup> ed)
6/16	1	Hemoglobin and gas transport	Faner			1. (F) [Chapter 3: Globular Proteins –all]; 2. (F) [Chapter 5: Enzymes – “Allosteric Enzymes”]
6/16	2	Blood pH regulation	Faner			1. (F) [Chapter 1: Amino Acids – from “Acidic and Basic Properties” through “Chapter Summary”]; 2. (R) [Chapter 24: Acid- Base Homeostasis – from “Introduction” through “Lungs are the Second Line of Defense against Changes in pH”]
6/18	3	Biomarkers in blood and urine	Faner	(F) [Chapter 5: Enzymes – from “Properties” through “Michaelis-Menten Kinetics” and “Enzymes in Clinical Diagnosis”]	D2L: Problem Set MF	
6/23	4	Tips for problem solving [Quiz 1]	Faner			
<b><u>Complete by 6/24</u></b>				1. (W) p. 1-30, Chapter 1. Oxidation State Patterns; 2. (W) p. 31-35 Chapter 2, Sections: Overview of Metabolism through Key Structures to be able to Draw and Recognize.		1. (F) Chapter 8 I. Introduction to Metabolism through II. Metabolism Regulation; 2. (F) Chapter 26, I. Overview through II. Assessment; 3. (F) Chapter 27, I. Overview through III. Energy Requirement in Humans
6/25	5	Overview of metabolism; carbohydrate digestion and absorption	Wilkins			(F) Chapter 7, III. Dietary Carbohydrate Digestion through the end of the chapter
6/25	6	Oxidation states	Wilkins		(W) Problem Set at end of Chapter 1	

Date ( <u>Complete by date</u> )	#	Subject	Instructor	Required Preparatory Readings W (Wilkins, 1 <sup>st</sup> ed); F (Ferrier, 7 <sup>th</sup> ed)	Required Readings and Other Assignments [W (Wilkins, 1 <sup>st</sup> ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 7 <sup>th</sup> ed); R (Rhoads, Bell, 5 <sup>th</sup> ed)
<u>Complete by 7/01</u>		Glycolysis and the shuttles	Wilkins	(W) Chapter 2. Metabolism Overview and Glycolysis.		1. (F) Chapter 8: III. Glycolysis Overview – to end of chapter; 2. (F) Chapter 6: VI. B. Membrane transport systems
<u>Complete by 7/01</u>		Entry of other sugars into glycolysis	Wilkins		(c.p.) pgs. 85-95	(F) Chapter 12, entire chapter
<u>Complete by 7/01</u>		Mitochondria and the Pyruvate Dehydrogenase (PDH) complex	Wilkins	(W) p. 65-73, Chapter 3, Sections on Mitochondrion: Structure and Function through The Pyruvate Dehydrogenase Complex: The bridging step between glycolysis and the TCA cycle		(F) Chapter 9: I. Cycle Overview through II. A. 5. Mechanism of arsenic poisoning
<u>Complete by 7/01</u>				1. (W) p. 73-85, Chapter 3. the Tricarboxylic Acid Cycle. 2. (W) p. 87-97, Chapter 4. The Electron Transport Chain. 3. (F) Chapter 6: V. Electron Transport Chain through the end of the chapter.		(F) Chapter 9: II. B. Citrate Synthesis through the end of the chapter
7/02	7	TCA cycle	Wilkins			
7/02	8	Electron Transport Chain (ETC)	Wilkins		(c.p.) pg. 129-130	
<u>Complete by 7/06</u>		Gluconeogenesis	Wilkins	(W) p. 99-108, Chapter 5, Sections: Three Key Branch Points in Metabolism and Gluconeogenesis	1. (D2L) Self-Study Application on Gluconeogenesis ( <i>c.p. pg. 135, instructions</i> ) 2. (F) Chapter 23: IV. Hypoglycemia C. Types 4. Alcohol-related hypoglycemia. 3. (c.p.) pg. 136 Gluconeogenesis: Clinical Application	(F) Chapter 10: entire chapter

Date (Complete by date)	#	Subject	Instructor	Required Preparatory Readings W (Wilkins, 1 <sup>st</sup> ed); F (Ferrier, 7 <sup>th</sup> ed)	Required Readings and Other Assignments [W (Wilkins, 1 <sup>st</sup> ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 7 <sup>th</sup> ed); R (Rhoads, Bell, 5 <sup>th</sup> ed)
<b><u>Completed by 7/06</u></b>				<p>1. (W) p. 108-121, Chapter 5, Sections: The Pentose Phosphate Pathway.</p> <p>2. (F) p. 357-358 [Chapter 27: Nutrition: Overview and Macronutrients – from “Overview” through “Dietary reference intakes”].</p> <p>3. p. 377-385 [Chapter 28: Micronutrients: Vitamins – from “Overview” through “Pantothenic acid (vitamin B5)”].</p> <p><b>A PDF copy of each of articles 4-6 has been posted at the course website on D2L&gt;Week 4&gt;Water Soluble Vitamins:</b></p> <p>4. Martel, J.L. and Franklin, D.S., “Vitamin B1 (thiamine)” Stat Pearls (2019).</p> <p>5. Vasan, S. and Dulebohn, S.C., “Wernicke encephalopathy” Stat Pearls (2017).</p> <p>6. Stroh, C., Meyer, F., Manger, T., “Beriberi, a severe complication after metabolic surgery --- review of the literature,” Obesity Facts (2014) 7: 246-252.</p>		
7/07	9	Pentose Phosphate Pathway (PPP)	Wilkins		(W) Problem Set at end of Chapter 5.	(F) Chapter 13, entire chapter
7/07	10	Storage of carbohydrates <b>[Quiz 2]</b>	Wilkins			(F) Chapter 11, entire chapter
7/08	11	Water soluble vitamins	He		D2L: Problem Set JH	
7/15		<b>UNIT EXAM 4 (covering sessions 1-11 and required readings)</b>				



Date ( <u>Complete by date</u> )	#	Subject	Instructor	Required Preparatory Readings W (Wilkins, 1 <sup>st</sup> ed); F (Ferrier, 7 <sup>th</sup> ed)	Required Readings and Other Assignments [W (Wilkins, 1 <sup>st</sup> ed); c.p., Course pack; D2L]	Suggested/Clarification readings: F (Ferrier, 7 <sup>th</sup> ed); R (Rhoads, Bell, 5 <sup>th</sup> ed)
<b><u>Complete by 7/22</u></b>				<p>1. (W) Chapter 6. Beta-oxidation of Fatty Acids and Ketone Body Synthesis.</p> <p>2. (W) Chapter 7. Fatty Acid Synthesis</p>	<p>1. (c.p.) pg. 185 Clinical problems regarding impaired FAO.</p> <p>2. (c.p.) pgs. 195-197 Case study: systemic carnitine deficiency.</p>	<p>1. (F) Chapter 16, entire chapter.</p> <p>2. (F) Chapter 17, I. Overview of phospholipids through VII. Synthesis and degradation of glycosphingolipids</p>
7/23	12	Fatty acid synthesis; $\beta$ -oxidation; ketone bodies	Wilkins			
7/23	13	Complex lipid synthesis and breakdown	Wilkins			
7/30	14	Hormones and hormone action: insulin and glucagon [ <b>Quiz 3</b> ]	Wilkins		(c.p.) pgs. 245-250 Review and integration of metabolic pathways, a self-review/self-assessment	(F) Chapter 23, entire chapter
8/04	15	Activity --- Low energy	Site Faculty	(W) Chapters 6 and 7	(c.p.) pg. 251	(F) Chapter 16, entire chapter
8/11	16	Activity --- What should be in the differential?	Wilkins		(c.p.) pgs. 253	
8/13	17	Activity --- Abnormalities in hormonal regulation	Site Faculty		(c.p.) pgs. 255-258	(F) p. 337-348 [Chapter 25: Diabetes Mellitus, all]
8/20		<b>UNIT EXAM 10 (covering sessions 1-17 and required readings)</b>				