

COURSE SYLLABUS
GMS 5905: FUNDAMENTALS OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
DISTANCE LEARNING
COURSE COORDINATOR: Dr. Kevin D. Brown

Fall Semester, 2017

Credit: four (4) hours

Course Description: GMS 5905 is a graduate-level course that surveys the structure, function, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. It introduces concepts in cell structure, replication and growth, and metabolic regulation.

Prerequisites: Organic Chemistry (CHM 2210 and 2211, CHM 2215 and 2216, or their equivalents at other universities) or consent of course coordinator. In certain cases, with permission, CHM 2211 or CHM 2216 may be taken concurrently.

Text: *Lehninger Principles of Biochemistry, 6th edition*, by David L. Nelson and Michael M. Cox. New York: W.H. Freeman and Company, 2012. Textbooks may be bought at the Health Center Bookstore (Room MG-15) and are also available in several other local, commercial bookstores. A few copies are currently on reserve in the Health Center Library, located in the Communicore building.

Web Page: This syllabus, lecture notes, lecture videos, expanded policies, and other information about the course are available on the "Canvas E-Learning" site, <https://ufl.instructure.com>. All course notes, video supplements, and announcements are available only at the Canvas site.

Lecture Notes: ALL faculty lecture notes for this course are available ONLY at the "Canvas E-Learning" site. All other course-related files can also be found there.

Tests and Grading: Grades will be based on student performance on four quizzes and two manuscript reviews within the semester. Each quiz is worth 100 points, each manuscript review is worth 100 points. Grades will be assigned based on the total number of points a student scores over the semester (600 total points available),

Multiple Choice Quiz: Quizzes 1-4 will be held (see syllabus below) during a reserved 42 hr time window extending from Friday to Saturday on established testing dates (9/15-16; 10/13-14; 11/10-11; and 12/1-2). Quizzes are available from 8:00 am on Friday to 11:59 pm on the following Saturday. The latest you can sign up to take the quiz is 9:00 pm on Saturday to allow you sufficient time to complete the quiz before the exam time window closes. Quizzes are 60 mins long, 25 multiple choice questions (4 points/question). Quizzes will cover the material discussed in the lecture videos, on the lecture notes, and in the textbook.

These quizzes will be administered using ProctorU (www.proctoru.com), I have included a PDF file explaining the process of signing up for ProctorU. Note, this on-line proctoring service requires a computer that is connected to the internet and has a web-cam. You are expected to take the exam on a computer that is **HARD-WIRED** to the internet to avoid being dropped during the exam. If your connection is dropped, ProctorU cannot re-establish your connection.

Manuscript Reviews: Manuscript Reviews will allow for assessment of student's ability to critically review the literature pertinent to materials presented in lecture. There will be two (2), 100 point Manuscript Reviews each semester, one presenting a paper pertinent to Quiz 2 material, the second pertinent to Quiz 4 material.

Please note a folder within the Modules tab marked Manuscript review documents. Within this folder will be i) a PDF file of the manuscript assigned to Review #1 or #2; ii) a videotaped review of Manuscript #1 or #2 by a faculty member, and iii) the questions to be answered for Manuscript Review #1 or #2. Answers to the questions posed should be formatted as either MSWord documents (.doc or docx) or PDF files and are to be emailed to Dr. Brown using the Canvas email system. Manuscript Review 1 is due on or before 11:00 pm (EDT) on October 19, Manuscript Review 2 is due on or

before 11:00 pm (EDT) on December 7, 2017. Failure to submit your Manuscript Review on time will result in a 20% penalty.

Make-up exams: It is anticipated that, given the wide latitude we have provided in scheduling exams, all students will be able to set their schedules to take all four exams during the indicated testing dates. Make-up exams can be provided given adequate documentation of a need to miss an exam, and will only be granted with the permission of the Course Director. It is anticipated that the need to make-up an exam will be a rare event.

Make-up exams will take place from Tuesday, December 5 at 8:00 AM (Eastern time) to 11:59 PM Wednesday, December 6. Grades will be calculated based on exam scores recorded as of the end of the make-up period - there will be no make-up of the make-up exam and there will be no make-up of Manuscript reviews.

Students requesting special-needs testing accommodation must first register with the Dean of Students Office, which will provide documentation to the student, who then must provide this documentation to the course coordinator.

Contact Information: Questions about course organization and operation, including exams and grades, should be directed to Dr. Brown via email using the Canvas email system.

Faculty:

Dr. Kevin D. Brown (KDB) kdbrown1@ufl.edu

Dr. Brian D. Cain (BDC) bcain@ufl.edu

Dr. Robert McKenna (“RMcK”) rmckenna@ufl.edu

Dr. William L. Zeile (“WLZ”) wzeile@ufl.edu

Dr. Daniel L. Purich (“DLP”) dlpurich@ufl.edu

Faculty office phone numbers are available on the Departmental Webpage (<http://biochem.med.ufl.edu>), however, email is the preferred contact method.

Supplemental Instruction:

A Teaching Assistant (TA) will be assigned to this course. The TA will be responsible for answering questions posted on the “Discussion” board on Canvas. The TA will also make available to the class various review materials such as:

- Video-guided worksheet reviews
- Video and print resources created by tutors
- Practice exams drafted by prior TAs

Further information on these tutoring resources will be made as the semester progresses.

Necessary Time Commitment and Management:

As a distance learning class, it is expected that each student manages his/her own time. Recognize, however, that GMS 5905 is a demanding course and will require a substantial and diligent time commitment to do well. On-campus, GMS 5905 is a 4 lecture / week course, such a time commitment should be similar for the distance learning students. We have had numerous distance learning students who have done quite well in the past, but do not underestimate the rigorous nature of this course and content.

**COURSE OUTLINE FOR
GMS 5905: FUNDAMENTALS OF BIOCHEMISTRY AND MOLECULAR BIOLOGY**

<u>Lecture</u>	<u>Lecturer</u>	<u>Lecture Topic</u>
L-1	RMcK	Biological Organization
L-2	RMcK	Water, Molecular Interactions, and Acid-Base Chemistry
L-3	RMcK	Nucleic Acids
L-4	RMcK	Amino Acids
L-5	RMcK	Peptides and Peptide Bonds
L-6	RMcK	Three-Dimensional Structure of Proteins
L-7	RMcK	Protein Dynamics and Protein Folding
L-8	RMcK	Protein Separation and Purification
L-9	RMcK	Protein Ligand Interactions
L-10	RMcK	Enzyme Mechanism and Catalysis I
L-11	RMcK	Enzyme Mechanism and Catalysis II
L-12	RMcK	Enzyme Kinetics and Inhibition
L-13	RMcK	Enzyme Regulation and Bioenergetics
L-14	RMcK	Carbohydrates and Glycobiology
L-15	RMcK	Lipids
Q-1	Friday, 9/15, 8:00am - Saturday, 9/16, 9:00pm QUIZ 1 [LECTURES L-1 THRU L-15]	
L-16	WLZ	Biological Membranes
L-17	WLZ	Membrane Proteins
L-18	WLZ	Membrane Protein Transporters
L-19	WLZ	Membrane Protein Signaling I
L-20	WLZ	Membrane Protein Signaling II
L-21	WLZ	Introduction to Metabolism

L-22	WLZ	Glycolysis
L-23	WLZ	Gluconeogenesis
L-24	WLZ	Glycogen Metabolism
L-25	WLZ	Regulation of Carbohydrate Metabolism
L-26	WLZ	Respiration and Introduction to the Citric Acid Cycle
L-27	WLZ	Citric Acid Cycle
L-28	WLZ	Electron Transport

Q-2 Friday, 10/13, 8:00am – Saturday, 10/14, 9:00pm QUIZ 2 [LECTURES L-16 THRU L-28]

Manuscript Review #1 DUE 10/19 @ 11:00pm

L-29	WLZ	Oxidative Phosphorylation
L-30	WLZ	Introduction to Lipid Metabolism and Fatty Acid Oxidation
L-31	WLZ	Ketogenesis and Fatty Acid Synthesis
L-32	WLZ	Regulation of Fatty Acid Oxidation and Synthesis
L-33	WLZ	Cholesterol Synthesis
L-34	WLZ	Plasma Lipoproteins
L-35	DLP	Amino Acid Metabolism: Digestion & Assimilation
L-36	DLP	Amino Acid Degradation and Disposition
L-37	DLP	Amino Acid Metabolism: Urea Cycle
L-38	DLP	Amino Acid Metabolism: Nonessential AA Biosynthesis
L-39	DLP	Amino Acid Metabolism: Specialized Amino Acids and Heme
L-40	DLP	Purine Nucleotide Biosynthesis, Degradation and Salvage
L-41	DLP	Pyrimidine Nucleotide Biosynthesis and Deoxynucleotide Biosynthesis
L-42	BDC	DNA and Chromatin
L-43	BDC	DNA Replication I

L-44 BDC DNA Replication II

Q-3 Friday, 11/10, 8:00am - Saturday, 11/11, 9:00pm QUIZ 3 [LECTURES L-29 THRU L-44]

L-45 BDC Prokaryotic Transcription and Gene Regulation

L-46 BDC Eukaryotic Transcription and Gene Regulation I

L-47 BDC Eukaryotic Transcription and Gene Regulation II

L-48 BDC Post-Transcriptional RNA Processing

L-49 BDC Protein Synthesis I

L-50 BDC Protein Synthesis II

L-51 BDC Post-Translational Modifications

L-52 KDB DNA Damage and Repair

L-53 KDB Recombination and Transposition

L-54 KDB Growth Factor Signaling

L-55 KDB Cell Cycle Control

L-56 KDB Cancer Biology I - Oncogenes

L-57 KDB Cancer Biology II - Tumor Suppressors

Q-4 Friday, 12/1, 8:00am – Saturday, 12/2, 9:00pm QUIZ 4 [LECTURES L-45 THRU L-57]

Manuscript Review #2 DUE 12/7 @ 11:00 pm

MAKE-UP (Requires Course Director prior approval): Tuesday, 12/5 – Wednesday, 12/6