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

Summer Semester, 2016

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, http://lss.at.ufl.edu. 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 exams within the semester. Exams are composed of two equally weighted components: A 50 point multiple choice quiz and a written manuscript review (also worth 50 points).

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 (5/27-28; 6/17-18; 7/8-9; and 7/29-30). 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. Exams will cover the material discussed in the lecture videos, on the lecture notes, and in the textbook.

These quizzes will be done 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 four (4), 50 point Manuscript reviews each semester. The manuscript to be reviewed by GMS 5905 students will be distributed by Canvas email on the Friday of each exam and will be due the following Friday by 5:00 pm (Eastern). Along with the manuscript to be reviewed will be set of questions to be answered by the student regarding aspects of the assigned paper. It is anticipated that the questions(s) posed in this manuscript review will be answerable in one (1) single page, single spaced document. Answers to Manuscript reviews should be typed and sent to Dr. Brown via Canvas email, preferably as PDF files. An instructional video outlining this aspect of the course will be posted on Canvas at the beginning of the course.

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, August 2 at 8:00 AM (Eastern time) to 11:59 PM Wednesday, August 3. 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 or kdbrown1@ufl.edu. Please put "Distance GMS 5905" in the subject line of the email so your email does not get overlooked.

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 Graduate 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 no underestimate the rigorous nature of this course and content.

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

Lecture	Lecturer	Lecture Topic
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**

E-1 Friday, 5/27- Saturday, 5/28 EXAM 1 [LECTURES L-1 THRU L-15]
E-1 Manuscript review: Due 6/3

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**

E-2 Friday, 6/17 – Saturday, 6/18 EXAM 2 [LECTURES L-16 THRU L-28]
E-2 Manuscript review due : 6/24

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**

E-3 Friday, 7/8 - Saturday, 7/9 EXAM 3 [LECTURES L-29 THRU L-44]
E-3 Manuscript Review due: 7/15

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**

E-4 Friday, 7/29 – Saturday 7/30 EXAM 4 [LECTURES L-45 THRU L-57]
E-4 Manuscript Review due: 8/5

MAKE-UP (Requires Course Director prior approval): Tuesday, 8/2 – Wednesday, 8/3