Syllabus

Instructor: Dr. Dmitry M. Kolpashchikov, Dmitry.Kolpashchikov@ucf.edu, Tel: 407-823-6752, Office**:** PSB 208. Office Hours: We, Th, Fr: 12:30 – 2:00 or at other time by prior e-mail appointment.

The course goals. The course is focused on understanding of chemical structure, reactivity and biological functions of the four major classes of biological compounds: carbohydrates, nucleic acids, proteins and lipids. By building on students' prior knowledge of general chemistry and organic chemistry the course aims at understanding chemical architecture of biological molecules and how this architecture serves their biological functions. The last subject 'Introduction to metabolism' prepares students for Biochemistry II course. The course is divided into three modules. Introductory module I is designed to refresh the knowledge of general and organic chemistries as well as introduce the four major classes of biological molecules. Module II focuses on protein structure and functions. Module III illustrates complex molecular interplay using biologically significant examples of protein-nucleic acid interactions, trans-membrane transportation and biological signaling.

Grading. Letter grades A, B, C, D or F will be assigned based on cumulative scores for six in class pop quizzes, nine Webcourse quizzes, two midterm exams, and a final exam.
Three homeworks (0% total). Homeworks will be assigned but not graded. Problems from homeworks will be offered for midterm and final exams.
Six in class pop quizzes (6% total). **No makeup quizzes are offered.** Quizzes will be unannounced. They will typically be on a topic covered in previous lectures or assigned reading. Quizzes will be accepted only if turned in before 10:20 am on the day of a quiz. **No makeup quizzes are offered.**
Nine Webcourse quizzes (9%). Multiple choice Quizzes will be offered via Webcourses.
Two midterm exams (20% each, 40% total, no exams will be dropped). Each of the two first modules end by a midterm exam. Midterm exams will focus on the recently covered subjects, but may also include all previously covered material. The scores for midterm exams will be adjusted based on the best performance in the class: best score is the new 100%.
Final exam (45%). Roughly half of the final will focus on material covered in Module 3; another half will be comprehensive. The scores for the final exam will be adjusted based on the best performance in the class: best score is the new 100%.
Grading system. Grades will be assigned based on statistical analysis of the class performance. As a guide for measuring your progress you may utilize the following grading scale: A: 75–100%; B: 60–75%; C: 45 – 60%; D: 35 – 45%; F: Below 35%. This scale may vary during the term.
Grade and score distribution. Scores and grades will be posted on Webcourses. Questions regarding scores or grades will not be answered via email or telephone due to FERPA laws.

Makeup exam policy. Makeup exams are for university approved excuses and by appointment only. **No makeups for quizzes.**

Textbooks: only one of the two following textbooks is required. "Fundamentals of Biochemistry", Voet D., Voet J.G., Pratt C.W, 4th edition or E-book "Biochemistry I", Gerasimova Y.V., Kolpashchikov D.M. - I ISBN: 978-0-7575-7664-5 www.kendallhunt.com.

Required prior knowledge: all concepts from general chemistry, organic chemistry, algebraic mathematics, basic biology.
Calculators: Calculators will be required during exams. It is expected that each student bring one on exam days. Graphing calculators are not allowed.

Academic dishonesty: UCF policies regarding honesty will be strictly enforced on all exams, quizzes and assignments. Violators will receive a grade of "F". For description of what constitutes academic dishonesty, please refer to p. 43 of the UCF student handbook (http://www.goldenrule.sdes.ucf.edu/).

Course Outline:

"Fundamentals of Biochemistry", Voet D., Voet J.G., Pratt C.W., 4th edition	"Biochemistry I", Gerasimova Y.V., Kolpashchikov D.M.
Module I Ch 1. Introduction to the Chemistry of Life (pp 1-21) Ch 2. Water (pp 22-39) Ch 8. Carbohydrates (only first part pp 217-223) Ch 3. Nucleotides and Nucleic Acids (pp 40-75) Ch 4. Amino acids, peptides, proteins (pp 76-92) Ch 9. Lipids (only first two parts, pp 241-257)	Module I Ch 1. Introduction to Biochemistry Ch 2. Chemical and physical foundations of life Ch 3. Interactions and reactions of water Ch 4. Carbohydrates-I: monosaccharides and oligosaccharides Ch 5. Nucleotides and Nucleic Acids-I Ch 6. Amino acids and peptides Ch 7. Lipids and lipid bilayers
Midterm Exam I (Mon, Oct 3)	
Module II Ch 8. Carbohydrates (polysaccharides pp 224-230) Ch 24. Nucleic Acid Structure (pp 821-832, 838-849) Ch 5. Proteins: Primary Structure (pp 93-126) Ch 6. Proteins: Three-Dimensional Structure (pp 127-166) Ch 7. Protein Function (pp 176-216) Ch 11. Enzymatic Catalysis (pp 315-354) Ch 12. Enzyme Kinetics, Inhibition and Control (pp 355-395)	Module II Ch 8. Carbohydrates II Ch 9. Nucleic acids II Ch10. Proteins and their primary structure Ch 11. Proteins: secondary structure Ch 12. Proteins: tertiary and quaternary structure Ch 13. Protein functions: hemoglobin Ch 14. Protein functions: muscle contraction Ch 15. Protein functions: antibodies Ch 16. Protein functions: enzymes Ch 17. Enzyme kinetics
Midterm Exam II (Mon, Nov 7)	
Module III Ch 8. Carbohydrates (glycoproteins, pp 230-240) Ch 24. Nucleic Acid Structure (pp 849-866) Ch 9. Biological Membranes (pp 258-287) Ch 10. Membrane Transport (pp 288-314) Ch 13. Biochemical Signaling (pp 396-435) Ch 14. Bioenergetics/Intro to Metabolism (pp 436-471)	Module III Ch 18. Glycoproteins Ch 19. DNA-protein interactions Ch 20. Biological membranes Ch 21. Membrane transport Ch 22. Signal transduction Ch 23. Introduction to metabolism
Final exam (Wed, Dec 7, 10:00 AM -12:50 PM)	

Midterm dates are approximate and may slight change if needed.

No classes: Sept 5, Nov 11, 25

Keys for Success in Biochemistry

Supplemental Instructions: Attend SI session. The announcement about SI session for the course will be made at the first week of the class.

Study Habits: Read the text before class, take notes in class, and review nightly. Make a habit of studying biochemistry on a daily basis.

Reading: If I ask you to read something, read it. There may be a quiz on it at the next class. If you read on material to be covered before class, you'll get more from the lecture.

Lectures: Take notes in class. Taking notes is an active form of learning and is always better than passively listening or falling asleep. The lectures are not designed to "teach" the material. Eighty percent of your learning will be with the text book. The lectures are designed to complement the textbook and intended to help you not "learn", but to put the material in context and to help you "understand" the material for true mastery.

Lecture slides: I will post the slides that I use. However, I do not recommend using the lecture slides for studying. The lecture slides are designed for me to lecture from. They are not designed for you to take notes on or to study from.

Materials from previous courses: Brush up on General Chemistry, Organic Chemistry, Analytical Chemistry, General Biology and Genetics. This course is setup with the assumption that students have mastery of the material from the earlier classes and builds upon that knowledge from the earlier classes.

A lot of material: This course contains a lot of information. Do not leave studying the material until immediately before the exam. If you delay until the last minute, it will be an overwhelming amount of material. Study biochemistry in a cumulative manner. Remember that the final is cumulative.

Chemical structures: Draw them out repeatedly until your hand knows the structure. Any structure of a molecule that is presented in lectures may be on exams. Molecules need to be understood by their size, shape and chemical nature. Thus, you need to be proficient in drawing them. Also, the more you draw it, you can draw it faster. Being able to quickly draw molecules can be a significant advantage during an exam.

Homework problems: The assigned homework problems are the *minimum*. Do as many problems as you can find. The more problems that you do, you'll be more prepared for exams. Practice, practice, practice.

Math skills: You will need to be proficient in basic algebraic math and some calculus. Also, be proficient with a calculator (non-graphing).

Exams: The questions on exams will test both the *breadth* and *depth* of your understanding of the material. Below are some tips to do your best:
What's on the exams? All material covered during lecture may be on an exam. Any material in the assigned chapters will fair game. Exceptions may be noted. The exam questions will be formulated in the style similar to those of quiz and homework problems.
READ the questions well. Sometimes reading the question is the hardest part of the problem. Be sure that you know what the question is telling you and what the question is asking for. Identify both important information and irrelevant information.
Write concise answers that specifically address the question. First before you start writing, think thoroughly through the problem, think about how to tackle the question in your head, and then start writing. I interpret long rambling answers as an indicator for not truly understanding.
Draw figures where appropriate. Pictures are worth a thousand words.

Note: The instructor reserves the right to modify the syllabus at any time.