

REVISED SYLLABUS

BCH 4024: INTRODUCTION TO BIOCHEMISTRY AND MOLECULAR BIOLOGY

COURSE COORDINATOR: Dr. Brian D. Cain

Fall Semester, 2017

Credit: four (4) hours

Course Description: BCH 4024 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.

Meeting Times and Places: Lectures are Mondays, Tuesdays, Wednesdays, and Fridays (4th and 6th periods) in the second-floor Stetson MSB (Medical Sciences Building) Auditorium (Room N2-200).

Prerequisites: Organic Chemistry (CHM 2210 and 2211, CHM 2215 and 2216, or their equivalents at other universities) or consent of course coordinator. CHM 2200 is not an acceptable prerequisite for BCH 4024.

Recommended Text: *Lehninger Principles of Biochemistry, 7th 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 available in several other local, commercial bookstores. Used copies of the 5th and 6th editions are widely available.

Web Page: This syllabus, expanded policies, and other information about the course are available on Canvas. The syllabus is also available on the BCH 4024 site, <http://biochem.med.ufl.edu/academics/undergraduate-courses>.

Lecture Notes: ALL faculty lecture notes for this course are available ONLY at the Canvas site. All other course-related files is also there. There is NO approved course package.

Attendance: We want to emphasize that attendance is central to success in this course. Students who regularly attend class and seek assistance or clarification score higher in BCH 4024 than those who do not. Office hours for lecturers will be announced in class and posted outside their office doors. The BCH4024 **Supplemental Instruction** program is very popular and highly effective.

Tests and Grading: Examinations will start at the times indicated below on Thursdays September 21, October 19 and November 9 in Room CG-28 (Computer Testing Center, Communicore Building, Health Science Center). The Final Exam will be on Tuesday December 12. The online exam **SIGN-UP** is mandatory. The sign-up for Exams 1-3 will be prior to Exam 1, and then a second sign-up will be before for Exam 4. If you will have a consistent conflict with these exam times, such as another class, lab, or some other exam, then **DO NOT** register for BCH4024.

The four, ninety-minute examinations are each worth one-hundred (100) points, with a course total of four-hundred (400) points. Students' final letter-grades will be determined **SOLELY** based on performance on those exams. Exams will cover the material discussed in the lectures, PowerPoint slides, and in the textbook. There is **NO EXTRA CREDIT**. For more detailed information on grading see the BCH4024 Testing and Grading Policies in Canvas. Information on the UF grading policy is available at: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>.

Students requesting special-needs classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student. The student must provide this documentation to **Dr. Brown** during the first week of the classes for **DRC accommodations**.

A make-up examination is available for students who miss **ONE** of the first three exams for some acceptable reason, **WITH PRIOR PERMISSION** from **DR. CAIN**. Generally, this will be illness, injury, or some unforeseeable scheduling conflict. Written documentation will be required for all makeup requests. All make-up exams are on Thursday, November 16 at 8:30 AM. Be warned that previous history suggests missing an exam correlates with a lower score. Although the makeup exams are designed for equal difficulty, they are weeks after the lectures for that section of the course. In addition, you will also have less time to study for Exam 4. The makeup exams are specific to the missed exam, not cumulative. No make-up exam is available for Exam 4, so to complete BCH4024 students must take Exam 4 as scheduled. Students failing to take an exam will receive zero points for that test. Exceptions are only granted with the explicit written prior approval of **Dr. Cain**.

The Testing Center uses **iMac** computers equipped with a scientific calculator (version 10.7.1). No other calculator is allowable during an exam. Students are strongly encouraged to practice functions such as log, anti-log and scientific notation on a Mac prior to taking exams. The proctors do **NOT** help students perform calculations.

By agreement of the faculty, BCH4024 will **NOT** allow individual students to review individual test questions after an exam. Be assured that exam questions undergo a rigorous statistical review after every question. The faculty take into account student concerns voiced during and after exams. Adjustments to the answer key may occur and extra points awarded based on the results of the faculty review. Dr. Cain is willing to review exam results with individual students upon request. Please note that Dr. Cain will not discuss whether questions were "fair" and there is no possibility of gaining any additional points.

Course Communications: Announcements are often in class and by email to your **ufl.edu** account. We cannot use gmail, yahoo or any other email for official business. It is your responsibility to attend class to hear announcements in class, clear your spam file, and regularly check your UF email account.

Course Contact Information: Questions about course organization, including exams and grades should be directed to Dr. Cain via email (not telephone). His office hours will be by "Appointment Only" until November when he begins lecturing in the class.

Faculty:

Dr. Brian D. Cain (abbreviated "BDC" in the syllabus), Course Coordinator
Office: R3-254 ARB
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Dr. Kevin Brown, Co-Coordinator (for DRC accommodations)
Office: R3-216B ARB
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Dr. Robert McKenna ("RMK")
Office: LG-179 McKnight Brain Institute
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Dr. William L. Zeile ("WLZ")
Office: R3-206A ARB
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Dr. Daniel L. Purich ("DLP")
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**COURSE OUTLINE FOR
 BCH 4024: INTRODUCTION TO BIOCHEMISTRY AND MOLECULAR BIOLOGY**

| <u>Lecture</u> | <u>Day and Date</u> | <u>Lecturer</u> | <u>Specific Topic</u> |
|-----------------------|----------------------------|------------------------|---|
| L-1 | Mon, 8/21/17 | RMK | Introduction and Course Organization Biological Organization |
| L-2 | Tue, 8/22/17 | RMK | Water, Molecular Interactions, and Acid-Base Chemistry |
| L-3 | Wed, 8/23/17 | RMK | Nucleic Acids |
| L-4 | Fri, 8/25/17 | RMK | Amino Acids |
| L-5 | Mon, 8/28/17 | RMK | Peptides and Peptide Bonds |
| L-6 | Tue, 8/29/17 | RMK | Three-Dimensional Structure of Proteins |
| L-7 | Wed, 8/30/17 | RMK | Protein Dynamics and Protein Folding |
| L-8 | Fri, 9/1/17 | RMK | Protein Separation and Purification |
| | Mon 9/4/17 | | Labor Day (no classes) |
| L-9 | Tue, 9/5/17 | RMK | Protein Ligand Interactions |
| L-10 | Wed, 9/6/17 | RMK | Enzyme Mechanism and Catalysis I |
| | Fri 9/8/17-9/13/17 | | IRMA |
| L-11 | Fri, 9/15/17 | RMK | Enzyme Mechanism and Catalysis II |
| L-12 | Mon, 9/18/17 | RMK | Enzyme Kinetics and Inhibition |
| L-13 | Tue, 9/19/17 | RMK | Enzyme Regulation and Bioenergetics |
| L-14/15 | Wed, 9/20/17 | RMK | Carbohydrates and Lipids |
| E-1 | Thurs, 9/21/17 | EXAM 1 | [LECTURES L-1 THRU L-13] 8:30-10:00 AM, 10:30-12:00 AM, 1:00-2:30 PM, 3:00-4:30 PM |
| L-16 | Fri, 9/22/17 | WLZ | Biological Membranes |
| L-17 | Mon, 9/25/17 | WLZ | Membrane Proteins |
| L-18 | Tue, 9/26/17 | WLZ | Membrane Protein Transporters |
| L-19 | Wed, 9/27/17 | WLZ | Membrane Protein Signaling I |

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| L-20 | Fri, 9/29/17 | WLZ | Membrane Protein Signaling II |
| L-21 | Mon, 10/2/17 | WLZ | Introduction to Metabolism |
| L-22 | Tue, 10/3/17 | WLZ | Glycolysis |
| L-23 | Wed, 10/4/17 | WLZ | Gluconeogenesis |
| | Fri, 10/6/17 | | Homecoming (no classes) |
| L-24 | Mon, 10/9/17 | WLZ | Glycogen Metabolism |
| L-25 | Tue, 10/10/17 | WLZ | Regulation of Carbohydrate Metabolism |
| L-26 | Wed, 10/11/17 | WLZ | Respiration and Introduction to the Citric Acid Cycle |
| L-27 | Fri, 10/13/17 | WLZ | Citric Acid Cycle |
| L-28 | Mon, 10/16/17 | WLZ | Electron Transport |
| L-29 | Tue, 10/17/17 | WLZ | Oxidative Phosphorylation |
| L-30 | Wed, 10/18/17 | WLZ | Introduction to Lipid Metabolism and Fatty Acid Oxidation |
| E-2 | Thurs, 10/19/17 | EXAM 2 | [LECTURES L-14 THRU L-27] 8:30-10:00 AM, 10:30-12:00 AM, 1:00-2:30 PM, 3:00-4:30 PM |
| L-31 | Fri, 10/20/17 | WLZ | Ketogenesis and Fatty Acid Synthesis |
| L-32 | Mon, 10/23/17 | WLZ | Regulation of Fatty Acid Oxidation and Synthesis |
| L-33/34 | Tue, 10/24/17 | WLZ | Cholesterol Synthesis and Plasma Lipoproteins |
| L-35 | Wed, 10/25/17 | DLP | Amino Acid Metabolism: Digestion & Assimilation |
| L-36 | Fri, 10/27/17 | DLP | Amino Acid Degradation and Disposition |
| L-37 | Mon, 10/30/17 | DLP | Amino Acid Metabolism: Urea Cycle |
| L-38 | Tue, 10/31/17 | DLP | Amino Acid Metabolism: Nonessential AA Biosynthesis |
| L-39 | Wed, 11/1/17 | DLP | Amino Acid Metabolism: Specialized Amino Acids and Heme |
| L-40/41 | Fri, 11/3/17 | DLP | Nucleotide Biosynthesis |
| L-42 | Mon, 11/6/17 | BDC | DNA Sequencing |
| L-43 | Tue, 11/7/17 | BDC | DNA Replication I |
| L-44 | Wed, 11/8/17 | BDC | DNA Replication II |

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| E-3 | Thurs, 11/9/17 | EXAM 3 | [LECTURES L-28 THRU L-41] 8:30-10:00 AM, 10:30-12:00 AM, 1:00-2:30 PM, 3:00-4:30 PM |
| | Fri, 11/10/17 | | Veteran's Day (no classes) |
| L-45 | Mon, 11/13/17 | BDC | Prokaryotic Transcription and Gene Regulation |
| L-46 | Tue, 11/14/17 | BDC | Eukaryotic Transcription and Gene Regulation I |
| L-47 | Wed, 11/15/17 | BDC | Eukaryotic Transcription and Gene Regulation II |
| E-MU | Thurs, 11/16/17 | | Makeup Exam (for students who miss one of the first three exams) 8:30-10:00 |
| L-48 | Fri, 11/17/17 | BDC | Eukaryotic Transcription and Gene Regulation III |
| L-49 | Mon, 11/20/17 | BDC | Post-Transcriptional RNA Processing |
| L-50 | Tue, 11/21/17 | BDC | Translation I |
| | Wed, 11/22/17 Fri, 11/24/17 | | Thanksgiving Holiday (no classes) |
| L-51 | Mon, 11/27/17 | BDC | Translation II |
| L-52 | Tue, 11/28/17 | BDC | Post-Translational Modifications |
| L-53 | Weds 11/29/17 | BDC | DNA Damage and Repair |
| L-54 | Fri, 12/1/17 | BDC | Recombination and Transposition |
| L-55/56 | Mon, 12/4/17 | BDC | Signal Transduction and Cell Cycle Control |
| L-57 | Tue, 12/5/17 | BDC | Cancer Mechanisms |
| L-58 | Wed, 12/6/17 | BDC | Cancer Mechanisms |
| E-4 | Tue, 12/12/17 | EXAM 4 | [LECTURES L-42 THRU L-58] 8:30-10:00 AM, 10:30-12:00 AM, 1:00-2:30 PM, 3:00-4:30 PM |