

COURSE SYLLABUS
BCH 4024: INTRODUCTION TO BIOCHEMISTRY AND MOLECULAR BIOLOGY
COURSE COORDINATOR: Dr. Brian D. Cain

Spring 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 held 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, 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. Used copies of the 5th edition 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 can also be found 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 score higher in BCH 4024 than those who do not. Office hours for the faculty 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 February 2, March 2 and March 30 in Room CG-28 (Computer Testing Center, Communicore Building, Health Science Center). The Final Exam will be on Tuesday April 25. Online exam **SIGN-UP** is mandatory. A sign-up will be held prior to Exam 1 for Exams 1-3, and then a second sign-up will be conducted 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** on the basis of their performance on these exams. Exams will cover the material discussed in the lectures or in the textbook. There is **NO EXTRA CREDIT**. For detailed information on grading please 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 provided 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 other unforeseeable scheduling conflict. Written documentation will be required for all makeup requests. All make-up exams are scheduled for Thursday, April 6 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 will be weeks later than the lectures for that section of the course, and you will also have less time to study for the final. 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 will be made only with the explicit prior approval of **Dr. Cain**.

The Testing Center uses **iMac** computers equipped with a scientific calculator (version 10.7.1). No other calculator is allowed 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 are prohibited from helping students perform calculations.

By agreement of the faculty, BCH4024 will **NOT** allow individual students to review individual test questions after an exam. There are no exceptions. Be assured that exam questions undergo a rigorous statistical review after every test. Student concerns voiced during and after the exam are taken into serious consideration. Often the answer key is adjusted 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.

Course Communications: Announcements will be made 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, 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 late March when he begins lecturing in the class.

Faculty:

Dr. Brian D. Cain (abbreviated “BDC” in the syllabus), Course Coordinator
Office: R3-254 ARB
bcain@ufl.edu

Dr. Kevin Brown, Co-Coordinator (for DRC accommodations)
Office: R3-216B ARB
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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 | Wed, 1/4/17 | DLP | Introduction and Course Organization Water and Acid-Base Chemistry |
| L-2 | Fri, 1/6/17 | DLP | Molecular Interactions |
| L-3 | Mon, 1/9/17 | DLP | Amino Acids |
| L-4 | Tue, 1/10/17 | DLP | Peptides and Peptide Bonds |
| L-5 | Wed, 1/11/17 | DLP | Three-Dimensional Structure of Proteins |
| L-6 | Fri, 1/13/17 | DLP | Protein Dynamics & Protein Folding |
| | Mon, 1/16/17 | DLP | Martin Luther King Day (no classes) |
| L-7 | Tues, 1/17/17 | DLP | Protein Ligand Interactions |
| L-8 | Wed, 1/18/17 | DLP | Enzyme Mechanism & Catalysis I |
| L-9 | Fri, 1/20/17 | DLP | Enzyme Mechanism & Catalysis II |
| L-10 | Mon, 1/23/17 | DLP | Enzyme Kinetics and Inhibition I |
| L-11 | Tue, 1/24/17 | DLP | Enzyme Kinetics & Inhibition II |
| L-12 | Wed, 1/25/17 | DLP | Enzyme Regulation and Bioenergetics |
| L-13 | Fri, 1/27/17 | DLP | Carbohydrates |
| L-14 | Mon, 1/30/17 | WLZ | Lipids |
| L-15 | Tue, 1/31/17 | WLZ | Biological Membranes |
| L-16 | Wed, 2/1/17 | WLZ | Membrane Proteins |
| E-1 | Thurs, 2/2/17 | 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-17 | Fri, 2/3/17 | WLZ | Membrane Protein Transporters |
| L-18 | Mon, 2/6/17 | WLZ | Membrane Protein Signaling I |
| L-19 | Tue, 2/7/17 | WLZ | Membrane Protein Signaling II |

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| L-20 | Wed, 2/8/17 | WLZ | Introduction to Metabolism |
| L-21 | Fri, 2/10/17 | WLZ | Glycolysis |
| L-22 | Mon, 2/13/17 | WLZ | Gluconeogenesis |
| L-23 | Tue, 2/14/17 | WLZ | Glycogen Metabolism |
| L-24 | Wed, 2/15/17 | WLZ | Regulation of Carbohydrate Metabolism |
| L-25 | Fri, 2/17/17 | WLZ | Respiration and Introduction to the Citric Acid Cycle |
| L-26 | Mon, 2/20/17 | WLZ | Citric Acid Cycle |
| L-27 | Tue, 2/21/17 | WLZ | Electron Transport |
| L-28 | Wed, 2/22/17 | WLZ | Oxidative Phosphorylation |
| L-29 | Fri, 2/24/17 | WLZ | Introduction to Lipid Metabolism and Fatty Acid Oxidation |
| L-30 | Mon, 2/27/17 | WLZ | Ketogenesis and Fatty Acid Synthesis |
| L-31 | Tue, 2/28/17 | WLZ | Regulation of Fatty Acid Oxidation and Synthesis |
| L-32 | Wed, 3/1/17 | WLZ | Cholesterol Synthesis |
| E-2 | Thurs, 3/2/17 | EXAM 2 | [LECTURES L-14 THRU L-28] 8:30-10:00 AM, 10:30-12:00 AM, 1:00-2:30 PM, 3:00-4:30 PM |
| L-33 | Fri, 3/3/17 | WLZ | Plasma Lipoproteins |
| | 3/4/17 to 3/12/17 | | Spring Break (no classes) |
| L-34 | Mon, 3/13/17 | DLP | Amino Acid Metabolism: Digestion & Assimilation |
| L-35 | Tue, 3/14/17 | DLP | Amino Acid Degradation and Disposition |
| L-36 | Wed, 3/15/17 | DLP | Amino Acid Metabolism: Urea Cycle |
| L-37 | Fri, 3/17/17 | DLP | Amino Acid Metabolism: Nonessential AA Biosynthesis |
| L-38 | Mon, 3/20/17 | DLP | Amino Acid Metabolism: Specialized Amino Acids and Heme |
| L-39 | Tue, 3/21/17 | DLP | Purine Nucleotide Biosynthesis, Degradation and Salvage |
| L-40 | Wed, 3/22/17 | DLP | Pyrimidine Nucleotide Biosynthesis & Deoxynucleotide Biosynthesis |
| L-41 | Fri, 3/24/17 | DLP | Nucleic Acid Structure |
| L-42 | Mon, 3/27/17 | BDC | DNA Sequencing |

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| L-43 | Tue, 3/28/17 | BDC | DNA Replication I |
| L-44 | Wed, 3/29/17 | BDC | DNA Replication II |
| E-3 | Thurs, 3/30/17 | EXAM 3 | [LECTURES L-29 THRU L-41] 8:30-10:00 AM, 10:30-12:00 AM, 1:00-2:30 PM, 3:00-4:30 PM |
| L-45 | Fri, 3/31/17 | BDC | Prokaryotic Transcription and Gene Regulation |
| L-46 | Mon, 4/3/17 | BDC | Eukaryotic Transcription and Gene Regulation I |
| L-47 | Tue, 4/4/17 | BDC | Eukaryotic Transcription and Gene Regulation II |
| L-48 | Wed, 4/5/17 | BDC | Eukaryotic Transcription and Gene Regulation II (continued) |
| E-MU | Thurs, 4/6/17 | | Makeup Exam (for students who miss one of the first three exams) 8:30-10:00 |
| L-49 | Fri, 4/7/17 | BDC | Post-Transcriptional RNA Processing |
| L-50 | Mon, 4/10/17 | BDC | Translation I |
| L-51-52 | Tue, 4/11/17 | BDC | Translation II and Post-Translational Modifications |
| L-53 | Wed, 4/12/17 | BDC | DNA Damage and Repair |
| L-54 | Fri, 4/14/17 | BDC | Recombination and Transposition |
| L-55-56 | Mon 4/17/17 | BDC | Signal Transduction and Cell Cycle |
| L-57 | Tue, 4/18/17 | BDC | Cancer Mechanisms |
| L-58 | Wed, 4/19/17 | BDC | Cancer Mechanisms |
| E-4 | Tue, 4/25/17 | 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 |