

## **BC467 Biochemistry of Human Disease Course Outline**

Course number and title: BC467 Biochemistry of Human Disease

Credits: 3

Term to be offered: Spring, MWF @ 1:00 PM, Anatomy-Zoology, E 210

Prerequisites: BC 401

Instructor: Dr. Eric Ross: [eric.ross@colostate.edu](mailto:eric.ross@colostate.edu) (MRB343)

Course description: This course will focus on specific diseases of current biochemical and medical interest, including genetic and metabolic disorders, chronic diseases, infectious agents and emerging diseases. Through lectures, presentations, and discussions, students will build upon their foundation in biochemistry and molecular biology to better understand the biochemical mechanisms of specific human diseases. *Please note that the exact topics to be covered are subject to change.*

Course objective: To provide students with up-to-date understanding of the biochemical basis of a wide range of human diseases and conditions. In particular, students will become knowledgeable in the mechanisms of disease etiology, progression and pathogenesis in humans.

Methods of evaluation: The course will consist primarily of lectures, complemented with classroom discussion and student presentations. The grade will be based on 4 exams (55%), online quizzes and assignments (25%); an oral presentation (15%), and participation in classroom discussions and activities (5%). As appropriate, homework grades will be incorporated into the exam grade for each section.

Instructional methodology: The teaching mode for this course will consist of a combination of lectures (in person or remote) and discussion, supplemented with student presentations and reading assignments.

Text: Selected review articles and primary literature.

Scheduling: 3 hours/week.

Academic Integrity: This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog – 1.6, pages 7-9 (<http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf>) and the Student Conduct Code (<http://www.conflictresolution.colostate.edu/conduct-code>). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

### **Course Topics:**

Jan 20-22: E. Ross

1. *Genetic Diseases:*

- Course Introduction, Introduction to Cytogenetic Disorders
- Cytogenetic Disorders: Microdeletion/duplication syndromes

Jan 25-29: E. Ross

- Cytogenetic Disorders:
  - i. Imprinting Diseases—Prader Willi/Angelman, etc.
  - ii. Structural rearrangements
  - iii. Aneuploidy – Sex chromosome changes

Feb 1-5: E. Ross

- ❑ Cytogenetic Disorders: Aneuploidy & Genetic Testing

Feb 8-12: E. Ross

- ❑ **Exam #1: Material through Feb. 5<sup>th</sup>**
- ❑ Metabolic diseases:
  - i. Lysosomal Storage Diseases and treatment—Gaucher, Fabry, etc.
  - ii. Aminoacidopathies and treatment—Phenylketonuria, etc.

Feb. 15-19 E. Ross

- ❑ *Snow Day*
- ❑ Structural defects —Duchenne muscular dystrophy, collagen, etc.
- ❑ Student presentation: Genetic diseases (Wednesday group, if in-person)

Feb. 22-26: E. Ross

- ❑ Student presentation: Genetic diseases (Monday group, if in-person)
- ❑ Defects in Receptor Proteins—hypercholesterolemia, hyperlipoproteinemia, etc
- ❑ Student Presentation: Genetic diseases (Monday group, if in-person)

March 1-5: E. Ross

- ❑ Hemoglobinopathies—sickle cell disease, thalassemias, etc.
- ❑ Mitochondrial Disorders; Transport defects: Cystic fibrosis
- ❑ Student Presentations: Genetic diseases (Wednesday group, if in-person)

March 8-12: E. Ross

- ❑ **Exam #2: Material from Feb. 12<sup>th</sup> through March 5<sup>th</sup>**
- ❑ Pharmacogenetics—Malignant hyperthermia, G6PD deficiency, etc.
- ❑ Student Presentations: Genetic diseases (Monday group, if in-person)

March 15-19:

2. *Protein misfolding disorders:*

- ❑ *Snow Day*
- ❑ Amyloid diseases – overview
- ❑ Student Presentations: Genetic diseases (Wednesday group, if in-person)

March 22-26:

- ❑ Amyloid diseases – Recent advances
- ❑ Prion diseases – Molecular basis.
- ❑ Student Presentations: Protein misfolding diseases (Monday group, if in-person)

March 29 - April 2:

- ❑ Prion diseases - Kuru, Creutzfeldt-Jakob Disease, Bovine Spongiform Encephalopathy (BSE)
- ❑ **Exam #3: Material from March 12<sup>th</sup> through April 2<sup>nd</sup>**
- ❑ Student presentations: Protein misfolding diseases (Wednesday group, if in-person)

April 5-9:

- ❑ Chronic Wasting Disease (CWD)
- ❑ Liquid-liquid phase separation in biology & disease
- ❑ Student presentations: Protein misfolding diseases (Monday group, if in-person)

April 12-16: Spring Break

April 19-23:

3. *Virology*

- ❑ Virology overview
- ❑ Virus subclasses; Influenza
- ❑ Student presentations: Viruses (Remote; presenter from Wednesday group)

April 26-30:

- ❑ COVID/SARS-CoV-2

4. *Special topics*

- ❑ Vaccines and autism
- ❑ Student presentations: Viruses (Remote; presenter from Monday group)

May 3-7:

- ❑ Causation versus correlation in medical research
- ❑ Student presentations: Viruses (Remote; presenters from Wednesday group)
- ❑ Student presentations: Viruses (Remote; 1 presenter from each group)

Finals week: Tuesday, May 11<sup>th</sup>, 4:10-6:10 PM.

- ❑ **Exam #4.** Material from April 5<sup>th</sup> to May 7<sup>th</sup>.

## Important information for students on COVID-19:

All students are required to follow public health guidelines in any university space, and are encouraged to continue these practices when off-campus(es). Students also are required to report any COVID-19 symptoms to the university immediately, as well as if they have potentially been exposed or have tested positive at a non-CSU testing location. If you suspect you have symptoms, please fill out the COVID Reporter (<https://covid.colostate.edu/reporter/>). If you have COVID symptoms or know or believe you have been exposed, it is important for the health of yourself and others that you complete the online COVID Reporter. Do not ask your instructor to report for you; if you report to your instructor that you will not attend class due to symptoms or a potential exposure, you are required to also submit those concerns through the COVID Reporter. If you do not have access to the internet to fill out the online COVID-19 Reporter, please call (970)491-4600.

If you report symptoms or a positive test, your report is submitted to CSU's Public Health Office. You will receive immediate, initial instructions on what to do and then you will also be contacted by phone by a public health official. Based on your specific circumstances, the public health official may:

- choose to recommend that you be tested and help arrange for a test
- conduct contact tracing
- initiate any necessary public health requirements or recommendations and notify you if you need to take any steps

If you report a potential exposure, the public health official will help you determine if you are at risk of contracting COVID.

For the latest information about the University's COVID resources and information, please visit the **CSU COVID-19 site** (<https://covidrecovery.colostate.edu/>).