

# BIOC 235 COURSE SYLLABUS

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## Course Introduction

**Course Title: Introduction to Molecular Medicine**

**Subject Code and Course Number: BIOC 235**

**Credit Hours: 3**

**Prerequisite Courses:** none

**Instructors:** Dr. Marieta Gencheva, Dr. Michael Schaller, Dr. Peter Mathers

**Class Meets:** Tue/Fri 2:00 – 3:30 pm, HSC-H 7607

### **Course Introduction:**

The course introduces the students to major types of human diseases, illustrating how current knowledge of biochemical pathways, molecular processes and cellular functions informs diagnosis and treatment. In the first block of the course the students will study genome organization, chromatin structure, mutations as determinants of inherited diseases in the context of sickle cell anemia and cystic fibrosis. In the second block they will study the metabolic pathways for carbohydrate and lipid utilization which are perturbed in Diabetes mellitus and the principles underlying diabetes therapy. Students will also learn how cells control growth and proliferation and the changes in signal transduction leading to different types of cancer. In the third block of the course the students will look at the molecular basis of neurodegenerative diseases, using Huntington's disease, Parkinson's disease, and muscular dystrophy as illustration.

The course will combine didactic lectures with active learning approaches (discussions, presentations) to help develop critical thinking and problem-solving skills in the learners.

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## Faculty Contact Information

### **Instructors:**

Marieta Gencheva, PhD (Course coordinator)

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Peter Mathers, PhD

Professor

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Office Hours: By appointment

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## Instructional Materials

Lectures will be delivered through Powerpoint and the files will be posted on the Health Sciences Center SOLE site. All additional materials required for class will also be posted on SOLE.

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## Course Learning Outcomes

Upon completion of this course, students will be able to:

1. Describe basic components, biochemical and metabolic processes in human cells which are altered in a variety of human diseases.
2. Analyze provided information about a disease to identify likely molecular participants in that disease process.

3. Identify diagnostic techniques suitable to detect a pathological state.
4. Apply knowledge of the pathophysiology of human diseases to explain modern treatment options.
5. Discuss ethical considerations related to diagnostics and treatment of human diseases.

## Assessment

### Grading Criteria for Major Assignments/Assessments:

Student performance in the course will be assessed using exams, quizzes, group projects and participation in class. There will be three block exams, each covering material taught in the corresponding course block. The exams will be open book/open notes type: students will have access to written information when answering exam questions.

There will be three quizzes in each block of the course. The quizzes will be released on SOLE at the beginning of class and completed in class. Remote completion of a quiz will only be possible with prior agreement of the instructor.

Students are expected to contribute to class discussion when reviewing the learning material and/or relevant manuscripts and video recordings. Participation in discussions will be graded at the end of each block using the rubric below:

Criteria	Needs Improvement	Satisfactory	Good	Excellent
Frequency and quality of participation	Needs prompting to participate, not engaged, answers show minimal effort.	Participates occasionally, provides comments related to the discussion, asks questions.	Participates often, asks relevant questions, provides answers and examples for clarification.	Participates often, able to answer questions and make connections between ideas, prompts further discussion and expands the understanding of all participants.
Command of material	Shows consistent gaps in knowledge.	Displays good grasp of the material discussed.	Demonstrates mastery of the material, able to summarize the material and connect ideas.	Statements, questions and opinions show in-depth understanding of key concepts and

				provide insight and perspective.
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The students will complete three group projects, one in each module of the course. Students will be assigned to groups by the instructor; group assignment will change with each course module. The projects will be graded based on the rubric below:

Criteria	Needs Improvement	Satisfactory	Excellent
Subject knowledge	Limited understanding of the disease discussed. Gaps in the knowledge on etiology, pathophysiology, diagnostics and treatment of the disease.	Sufficient knowledge of the etiology, pathophysiology, diagnostics and treatment of the disease.	In-depth knowledge of the etiology, pathophysiology, diagnostics or treatment of the disease, ability to integrate knowledge from different sources, suggestion of alternative explanations or perspectives on an issue.
Quality of presentation	Slides have key details missing or irrelevant information.	Slides have appropriate information and are well organized.	Slides are logically arranged, illustrate key points, are easy to follow, prompt discussion.
Supporting materials	Insufficient sources or sources with poor validity.	Sources are sufficient and reputable.	Sources provide different viewpoints and broaden the understanding of the topic discussed.
Contribution to the group effort	Minimal effort to complete the tasks assigned.	Satisfactory and timely completion of assigned tasks.	Consistent effort to complete assigned tasks, organization of the group activity, provides motivation and help to others.

Final grades will be determined from the percentage of total points earned by the students throughout the semester. 60% of the final grade will be based upon performance on the three block exams. The remaining 40% of the final grade will be based upon student participation in active learning sessions, scores on quizzes and group projects.

### Points

Block exams (3 x 60 points each)	180
Quizzes (9 x 5 points each)	45
Class participation (3 x 10 points each)	30
Group projects (3 x 15)	45
<b>Total points</b>	<b>300</b>

### **Mid-Semester Grade:**

Mid-semester grades will be reported based upon student performance on the first block exam, 6 quizzes, one group project and participation grade from the first block of the course. Mid-term grades will reflect scores from approximately the first 30% of total points available in the course.

### **Final Grading Scale:**

Final grades will be assigned using the following general scale for percent of total available points:

Letter grade	Percent of Total points	Points
A	100-90%	270 and above
B	89-80%	240 – 269
C	79-70%	210 – 268
D	69-55%	165 – 267
F	<55%	Below 165

Final grades may deviate slightly from the scale above but the cutoffs will never be higher than the numbers indicated in the table.

## **Course and Institutional Policies**

### **Attendance Policy**

Students are expected to attend classes. Absences without legitimate reason will result in decrease of the participation grade and 0 points on quizzes. Students with a

legitimate reason to miss a class should inform the instructors in advance and work with them to make up the assignments.

### **Late Assignment and Missed Exam Policy**

Block exams will be open book take home exams which need to be completed in a certain timeframe. Rescheduling or extra time for completion will be given only for legitimate reasons. Students who miss class will only be able to make up a quiz if they have informed the instructor about the absence in advance. The group project will be presented in class and there will be no possibility for make-up. Students who have a legitimate reason to miss the class presentation will have the possibility to complete an additional assignment for extra credit. Assignments missed without informing the instructor about the absence in advance or with no legitimate reason will result in 0 points.

### **Inclusivity Statement**

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in your classes, please advise your instructors and make appropriate arrangements with [the Office of Accessibility Services](#).

More information is available at the [Division of Diversity, Equity, and Inclusion](#) website as well.

### **Academic Integrity Statement**

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, instructors will enforce rigorous standards of academic integrity in all aspects and assignments of their courses. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the West Virginia University [Academic Standards Policy](#). Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see your instructor before the assignment is due to discuss the matter.

### **Mental Health Statement**

Mental health concerns or stressful events can adversely affect your academic performance, social relationships and quality of life. WVU's BeWell office offers free, confidential counseling services to assist you with addressing these and other concerns that you may be experiencing. You can schedule an appointment in the

HSC BeWell clinic by calling 304-293-1292 or 304-293-1353. You can also email the BeWell Coordinator, Layne Hitchcock, at [layne.kehl@mail.wvu.edu](mailto:layne.kehl@mail.wvu.edu) or request an appointment online at [health.wvu.edu/bewell](http://health.wvu.edu/bewell).

BeWell is an extension of the Carruth Center for Counseling and Psychological Services, and you can learn more about mental health resources on their website at [carruth.wvu.edu](http://carruth.wvu.edu).

If you are in need of crisis services, call the Carruth Center's main number 24/7: (304) 293-4431. You can also text WVU to 741741.

[A longer version of this optional statement](#) is available for reference.

### Tentative Course Schedule:

The schedule is subject to change due to unforeseen circumstances (inclement weather, public health related events etc).

**BIOC235 Introduction to Molecular Medicine  
Fall 2023, Tue/Fri 2-3:30**

Date	Topic
<b>Block 1 Genetics and Inherited Diseases (Marieta Gencheva)</b>	
8/18/2023	Pretest, History of Molecular Medicine
8/22/2023	DNA, chromosomes, genomes, mutations
8/25/2023	Modes of Inheritance I. Mendelian genetics
8/29/2023	Modes of Inheritance II. Mitochondrial diseases
9/1/2023	Detecting Sequence Variations in the Genome I
9/5/2023	Detecting Sequence Variations in the Genome II/Review
9/8/2023	Sickle Cell Disease
9/12/2023	Cystic Fibrosis
9/15/2023	Subit Barua, Director of Molecular Pathology; Pathology, Anatomy and Laboratory Medicine
	Exam 1
<b>Block 2 Diabetes and Cancer (Mike Schaller)</b>	
9/19/2023	Diabetes - Signal Transduction - How Cells Know What To Do
9/22/2023	Sugar and Lipid Metabolism - How Cells Get Energy
9/26/2023	Diabetes - Altered Metabolism - Diagnosis - What Goes Wrong
9/29/2023	Prevention, Management and Treatment of Diabetes
10/3/2023	Cancer - Hallmarks of Disease - Signal Transduction - Oncogenes and Tumor Suppressors
10/6/2023	Fall Break, No class

10/10/2023	Growth Control, Cell Cycle and Cell Death
10/13/2023	Development of Cancer - What Goes Wrong
10/17/2023	Prevention and Treatment of Cancer
10/20/2023	Review/Clinicians visit
	Exam 2
	<b>Block 3 Neurodegenerative Diseases (Peter Mathers)</b>
10/24/2023	Muscular Dystrophy- Symptoms and Genetics
10/27/2023	Muscle Structure and Function
10/31/2023	Presentations on Treatment Options for Muscular Dystrophy
11/3/2023	Huntington's Disease- Symptoms and Genetics
11/7/2023	Brain Structure and Protein Aggregation (Ethical Issue Discussion)
11/10/2023	Parkinson's Disease (PD)- Symptoms and Causes
11/14/2023	Neural Circuits and Activity
11/7/2023	G-protein Signaling via Dopamine
11/21/2023	Thanksgiving, No class
11/24/2023	Thanksgiving, No class
11/28/2023	Presentations on Treatment Options for PD- Grand Rounds with Neurologist
12/1/2023	Review and course wrap-up
12/5/2023	Exam 3
12/7/2023	Last day of classes