

Term Information

Effective Term Autumn 2020
Previous Value Spring 2016

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

We propose changing MOLGEN 5300 from a 2 to a 3 credit hour course. Students will engage in self-directed learning and complete in-class reflections on topics currently covered in the course.

What is the rationale for the proposed change(s)?

Students consistently indicate on SEIs that the course workload, which includes a collaborative group project, exceeds that of comparable 2 credit hour electives. The students also indicate that they enjoy in class practice questions and discussions. These activities were reduced in 2015 when the course textbook was swapped for online resources and additional background material needed to be covered in class. We see MOLGEN 5300 as an ideal course for the implementation of student-directed learning projects and would use the extra instruction time to help students explore lecture-related topics of their own choosing. Changes to course are highlighted in attached syllabus.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?
none

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Molecular Genetics
Fiscal Unit/Academic Org	Molecular Genetics - D0340
College/Academic Group	Arts and Sciences
Level/Career	Graduate, Undergraduate
Course Number/Catalog	5300
Course Title	Cancer Genetics
Transcript Abbreviation	Cancer Genetics
Course Description	Students will learn about the genetic evolution of human cancer. Specifically, the hallmarks of cellular transformation and tumor progression will be discussed. Students will be introduced to modern approaches aimed at targeting genetic aberrations in cancer cells. Includes hands-on training in the use of online databases of cancer genetics.
Semester Credit Hours/Units	Fixed: 3
<i>Previous Value</i>	<i>Fixed: 2</i>

Offering Information

Length Of Course	14 Week, 12 Week, 8 Week, 7 Week, 6 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture

Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Prereq: C- or better in 4606 or 4500; or Grad standing.
Exclusions	
Electronically Enforced	No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.0804
Subsidy Level	Doctoral Course
Intended Rank	Junior, Senior, Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Understand the fundamental concepts of cancer biology
- Appreciate how genetic and epigenetic processes influence tumor development
- Know modern approaches to study cancer genetics
- Understand how genetics is influencing modern cancer therapy
- Navigate, vet and gather cancer-related information from publicly available resources.
- *Understand the fundamental concepts of cancer biology*
- *Appreciate how genetic and epigenetic processes influence tumor development*
- *Know modern approaches to study cancer genetics*
- *Understand how genetics is influencing modern cancer therapy*

Previous Value

Content Topic List

- What is cancer
- Hallmarks of cancer
- Angiogenesis and Invasion
- Tumor suppressors
- Oncogenes
- Cancer susceptibility
- Epigenetic and cancer
- The cancer genome (GWAS, next generation sequencing)
- Applic. of next gen. sequencing to cancer biology

Sought Concurrence

No

Attachments

- Proposed MOLGEN 5300 Syllabus Fall 2020.docx: Syllabus with changes highlighted
(Syllabus. Owner: Cole, Susan Elizabeth)

Comments

- Concurrence was received in 2016 when course was originally developed. These minor changes do not require additional concurrence *(by Cole, Susan Elizabeth on 11/04/2019 02:50 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Cole, Susan Elizabeth	11/04/2019 02:52 PM	Submitted for Approval
Approved	Cole, Susan Elizabeth	11/04/2019 02:52 PM	Unit Approval
Approved	Haddad, Deborah Moore	11/04/2019 03:49 PM	College Approval
Pending Approval	Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Oldroyd, Shelby Quinn Vankeerbergen, Bernadette Chantal	11/04/2019 03:49 PM	ASCCAO Approval

MOLGEN 5300: CANCER GENETICS

3 Credit Hour Lecture Course
Tuesdays and Thursdays 10:20-11:40 am
Campbell Hall, Rm 200

COURSE DIRECTORS:

Christin E. Burd, Assistant Professor
Pronouns: she/her
Departments of Molecular Genetics &
Cancer Biology and Genetics
Biomedical Research Tower, Rm 918
Phone: 688-7569
Email: burd.25@osu.edu

Craig J. Burd, Assistant Professor
Pronouns: he/him/his
Department of Molecular Genetics
Biomedical Research Tower, Rm 920
Phone: 688-7458
Email: burd.7@osu.edu

Please be sure to use your name.# account when communicating with instructors.

OFFICE HOURS:

Every Friday from 3:30-4:30 pm
918 or 920 Biomedical Research Tower

Additional Pre-Exam Office Hours

Location to be announced in class

Friday, September 18th 4:00-5:15pm
Friday, October 23rd 4:00-5:15pm
Thursday, December 10th 9:00-10:30am

COURSE MATERIALS:

- No textbook is required. Links to open source reading and A/V materials will be provided by the course directors on Carmen.
- Although not required, students are encouraged to bring cell phones and/or Wi-Fi enabled personal laptops to class. These devices will be used to complete electronic in-class questions and surveys.

COURSE DESCRIPTION:

During this course, students will learn how genetic and epigenetic changes play a role in cancer initiation, progression and therapeutic resistance. The course will begin with an overview of the hallmarks of cancer and then progress to discuss cancer genome sequencing and its impact on research, pre-clinical drug design and patient care. Coursework will include basic training in the use of publically available software to visualize next-generation DNA sequencing (Integrated Genome Viewer) as well as online cancer genetics databases (*e.g.* COSMIC, cBioportal). Each student will pick a cancer type of interest and learn to independently explore questions related to the class discussion using online resources.

LEARNING OBJECTIVES:

- 1. Describe and apply fundamental concepts in cancer biology**
Students will learn the hallmarks of cancer as defined by Hanahan and Weinberg and apply these concepts throughout the course.
- 2. Explain how genetic and epigenetic changes influence tumor development and progression**
Cancer-associated genetic and epigenetic alterations will be described in detail and students will learn the consequences of these events on cancer initiation and progression.

3. Understand modern techniques and databases used to study cancer genetics

Students will learn how to access and harness information from cancer databases such as Oncomine and The Cancer Genome Atlas (TCGA). Methods of high-throughput genomic and epigenomic analysis will be explained.

4. Communicate how genetics are influencing modern cancer therapy

Students will learn about personalized cancer therapy. They will be able to describe how drugs targeting the genetic alterations unique to a patient's tumor are generated and tested. Mechanisms of resistance will be discussed.

5. Navigate, vet and gather cancer-related information from publically available resources.

Students will identify and use publically available resources to answer their own questions about cancer incidence, mortality, morbidity, genetics, clinical trials and research. They will employ methods to assess the quality of each source (cross-referencing, peer review, consideration of statistical power and potential source bias) and reflect upon what they have learned.

COURSE SCHEDULE:

DATE	TOPIC	LECTURER	LECTURE #
Aug. 25 th	Introduction <ul style="list-style-type: none">Review of course syllabus, Top Hat, grading and expectationsWhat is cancer?	Christin Burd	1
Aug. 27 th	Hallmarks of Cancer <ul style="list-style-type: none">Part 1 – Proliferation and Resistance to Death	Christin Burd	2
Sept. 1 st	Hallmarks of Cancer <ul style="list-style-type: none">Part 2 – Angiogenesis and Invasion	Christin Burd	3
Sept. 3 rd	Hallmarks of Cancer <ul style="list-style-type: none">Part 3 – The Immune System	Christin Burd	4
Sept. 8 th	Hallmarks of Cancer <ul style="list-style-type: none">Part 3 – The Immune System continued	Christin Burd	5
Sept. 10 th	DNA Damage and Repair	Christin Burd	6
Sept. 15 th	Tumor Suppressors	Craig Burd	7
Sept. 17 th	Oncogenes	Craig Burd	8
Sept. 22 nd	IN CLASS WRITTEN EXAM – Lectures 1-8		
Sept. 24 th	The Genetics of Cancer Susceptibility <ul style="list-style-type: none">GWAS	Christin Burd	9
Sept. 29 th	The Genetics of Cancer Susceptibility <ul style="list-style-type: none">Heritable vs. somatic mutationsEnvironmental influence on cancer susceptibility	Craig Burd	10
Oct. 1 st	Heterogeneity of Tumor Genetics	Craig Burd	11
Oct. 6 th	Epigenetics <ul style="list-style-type: none">Chromatin biology	Craig Burd	12
Oct. 8 th	Epigenetics <ul style="list-style-type: none">DNA methylation in cancer	Craig Burd	13
Oct. 13 th	Epigenetics <ul style="list-style-type: none">Histone modifications in cancer	Craig Burd	14
Oct. 15 th	FALL BREAK		
Oct. 20 th	Next Generation Sequencing Technologies	Craig Burd	15
Oct. 22 nd	Mapping the Cancer Genome	Craig Burd	16

Oct. 27 th	IN CLASS WRITTEN EXAM – Lectures 9-16		
Oct. 29 th	Using Integrated Genome Browser (IGV), Group Project Introduction	Craig Burd	17
Nov. 3 rd	Using Cancer Genetics Databases <ul style="list-style-type: none"> • Introduction to ONCOMINE and COSMIC 	Craig Burd	18
Nov. 5 th	Using Cancer Genetics Databases <ul style="list-style-type: none"> • Introduction to cBioportal and TCGA 	Craig Burd	19
Nov. 10 th	In class group project: Using cancer genetic databases	Craig & Christin Burd	20
Nov. 12 th	Genetically Engineered Mouse Models (GEMMs) of Human Cancer <ul style="list-style-type: none"> • History of mouse models, transgenics and oncogene addiction 	Christin Burd	21
Nov. 17 th	Genetically Engineered Mouse Models (GEMMs) of Human Cancer <ul style="list-style-type: none"> • Knock-in and knock-out mouse models 	Christin Burd	22
Nov. 19 th	Genetically Engineered Mouse Models (GEMMs) of Human Cancer <ul style="list-style-type: none"> • Conditional mouse models 	Christin Burd	23
Nov. 24 th	From Genetics to Targeted Therapies <ul style="list-style-type: none"> • Chemotherapy and radiation, development of Gleevec 	Christin Burd	24
Nov. 26 th	No Class - Thanksgiving		
Dec. 1 st	From Genetics to Targeted Therapies <ul style="list-style-type: none"> • Vemurafenib and targeted therapy resistance 	Christin Burd	25
Dec. 1 st	All course reflections must be complete		
Dec. 3 rd	GROUP PRESENTATIONS - Location TBD	Craig & Christin Burd	
Dec. 8 th	GROUP PRESENTATIONS - Location TBD	Craig & Christin Burd	
Dec. 11 th	FINAL EXAM - Lectures 17-25 10:00-11:45am Campbell Hall Rm 200	Craig & Christin Burd	

GRADING POLICY:

The course is graded on an A-E basis. Five components will be used to determine a final grade:

In-class written exam #1	25%
In-class written exam #2	25%
In-class written exam #3	25%
Reflections journal	10%
In-class group presentation	15%
Total:	100%

GRADING SCALE:

A	93-100%	C+	77-79.9%
A-	90-92.9%	C	73-76.9%
B+	87-89.9%	C-	70-72.9%
B	83-86.9%	D	65-69.9%
B-	80-82.9%	E	<65%

COURSE ATTENDANCE POLICY:

In order to be successful in this course, attendance is expected for all lectures and mandatory for all in-class exams and projects.

STATEMENT ON ACADEMIC MISCONDUCT:

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

PLEASE TAKE CARE OF YOURSELF (Mental Health Statement):

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student’s ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing.

If you are or someone you know is suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life’s Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614-292-5766.

If you are thinking of harming yourself or need a safe, non-judgmental place to talk, or if you are worried about someone else and need advice about what to do, 24 hour emergency help is also available through the Suicide Prevention Hotline (Columbus: 614-221-5445 / National: 800-273-8255); or text (4hope to 741741); or at suicidepreventionlifeline.org

STATEMENT ON DISABILITY SERVICES:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.