

MMG490-001

Understanding Cancer: From Biology and Epidemiology to Prevention and Therapy

- Syllabus -

COURSE INFORMATION

D2L: US19-MMG-490-001 Spec Problems in Microbiology

Dates & Times: Wednesday, May 15 - August 14, 6:00-9:30 PM

Location: IQ Building, Room 1000

Instructor: Michael H. Bachmann, M.D., Sc.D.
Office: 1318 IQ Bioengineering Bldg.
Phone: 844-7467
Email: mhb@msu.edu

The course will start on May 15 with a general introduction. There will be twelve sessions, with a two week break in July.

I. Overview

Cancer is an important public health issue: one in three Americans are diagnosed with some type of cancer in their lifetime, and one in six die from the disease. Consequently, cancer is an important topic of much research. This course is designed for newcomers to this field - undergraduate and graduate students as well as postdoctoral fellows from other scientific fields - and provides essential concepts and fundamental knowledge about cancer, its biology, and the most common manifestations of this disease. More specifically, we will cover mechanisms of carcinogenesis, cancer genes and signaling pathways, the tumor microenvironment, invasion and metastasis, tumor immunology, diagnostics, prevention, and cancer therapies.

Each class will feature a lecture based on Robert Weinberg's textbook "The Biology of Cancer", followed by a documentary film (or one of a documentary film series) on cancer and related topics, and will be concluded with a class discussion.

II. Readings Materials

Required

1. Title: The Biology of Cancer, Author: Robert A. Weinberg Edition: 2nd, ISBN: 978-0815342205; <http://books.wwnorton.com/books/webad-detail-editions.aspx?id=4294997091>
2. Title: Anti-cancer: A New Way of Life, Author: David Servan-Schreiber Edition: 2nd, ISBN: 0670021644
3. Title: Living Downstream: An Ecologist's Personal Investigation of Cancer and the Environment, Author: Sandra Steingraber, Edition: 2nd, ISBN: 0306818698

Highly Recommended:

1. Title: The Emperor of Maladies, Author: Siddharta Mukherjee, Edition: 1st, ISBN: 1439170916
2. Title: Cancer: 101 Solutions to a Preventable Epidemic, Authors: Liz Armstrong and Guy Dauncey, Edition: 1st, ISBN: 0865715424

III. Expected Learning Outcomes

By the end of this course, participants will have acquired a working knowledge of the principles of cancer biology and understand the complexities of diagnosis, medical treatment and prevention of cancer. Selected major topics will include: control of growth in normal and cancer cells, the genetic basis of cancer (oncogenes and tumor suppressor genes), dysregulation of cellular signaling pathways, cell cycle regulation and apoptosis, immortality and failure of genome maintenance, tumor initiation and progression, carcinogens (physical, chemical, and microbiological) and their mechanisms of action, tumor immunology, cancer prevention, diagnostics, and cancer treatment strategies. Students will be provided with online resources on cancer, its biology, and epidemiology for self-study and research. Novel diagnostics and experimental treatments, in particular immunotherapy, will also be discussed.

IV. D2L, Announcements, and Electronic Communications

Announcements will be made either in class or by D2L e-mail. Course materials, lecture slides, and all study aids will be posted on D2L. We will also use the D2L mail system to send course announcements, so you should be sure that this system is connected to your e-mail account or that you check the D2L mail system regularly. Questions regarding grades, course mechanics, or of a personal nature should be sent by e-mail directly to Dr. Bachmann.

V. Presentation

Students will research a topic of interest and give a 10-15 minute presentation to the class at the end of the course. Guidance and assistance with researching the topic will be provided by the instructor.

VI. Course Grades

Assessment Type	%	Notes
Exam I	(20%)	
Exam II	(20%)	
Take Home Exam	(20%)	
Presentation	(30%)*	
Attendance and Participation	(10%)*	Maximally two classes may be missed. For missed classes please obtain the lecture slides and the notes from your fellow students to catch up with the class.

Grade	%
4.0	> 88%
3.5	> 82%
3.0	> 75%
2.5	> 68%
2.0	> 62%
1.5	> 55%
1.0	> 46%
0.0	≤ 46%

This grading scale shows the percentage you must receive to guarantee a particular grade. The grades in the course will be adjusted if necessary based on the final distribution of scores. This adjustment may raise your grade from the scale shown here, but it will not lower your grade.

Academic Integrity/Cheating Policy

According to the MSU policy on the integrity of scholarship and grades, "The principles of truth and honesty are fundamental to the educational process and the academic integrity of the University". Every student should be familiar with this policy (<https://www.msu.edu/unit/ombud/academic-integrity/index.html>). All students have a right to expect fair and honest evaluation of their work. Cheating undermines this expectation and will not be tolerated. You are expected to work with classmates on active learning clicker questions and during modeling activities. However, bringing a friend's clicker to class when they cannot attend or giving your clicker to a classmate on days you cannot attend is cheating. Sharing answers during quizzes or exams is cheating. Any student found by the instructors to be cheating will receive a failing grade for the exam or other graded work and reported to the Dean. The instructors may, at their discretion, decide to give a failing grade for the course in severe, repeat, or egregious cases of academic dishonesty. Please hold yourself, and your classmates, to the highest ethical standards in this regard!

Accommodations for Persons with Disabilities

Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at www.rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a verified individual services accommodation ("VISA") form. Please present this form to Dr. Bachmann at the start of the term, at the latest two weeks prior to the first accommodation date. Requests received after this date may not be honored. Please contact your instructors if you believe you need additional accommodations.

The MSU Disability and Reasonable Accommodation Policy - MSU RCPD can be viewed here:

» <https://www.rcpd.msu.edu/download/214>

Student Responsibility

Study at a university places a premium on self-motivation, and the responsibility for learning falls increasingly on you, the student, as you advance through your program. Ultimately, the commitment and the dedication to learn must come from you. If you accept this responsibility, you will be provided an educational opportunity that can benefit you and the society in which you live, regardless of your career path.

As members of a learning community, students are expected to respect the intellectual property of the course instructors. All course materials presented to students are the copyrighted property of the course instructors and are subject to the following conditions of use:

- 1) Students may record lectures or any other classroom activities, however, they may use the recordings only for their own course-related purposes.
- 2) Students may not post the recordings or other course materials online or distribute them to anyone without the advance written permission of the course instructor and if applicable, any students whose voice or image is included in the recordings.
- 3) Any student violating the conditions described above may face academic disciplinary sanctions.

As members of a learning community, students are expected to respect the time and efforts of their fellow classmates. Therefore, the use of social media and other electronic distractions that can disrupt the concentration of other students in the classroom is NOT allowed.

VI. Course schedule (Tentative):

Week # Date	Lecture Topic	"Biology of Cancer" by R.A. Weinberg	"Anti-cancer" by D. Servan- Schreiber	"Living Downstream" by S. Steingraber
Week 1 May 15	Course Overview History and Epidemiology The Nature of Cancer	Chapters 1, 2	1, 2	1
Week 2 May 22	Tumor Viruses Cellular Oncogenes	Chapters 3, 4	3	2
Week 3 May 29	Growth Factors and their Receptors Cytoplasmic Signaling Circuitry	Chapters 5, 6	4	3
Week 4 June 5	Tumor Suppressor Genes pRb and the Cell Cycle Clock	Chapters 7, 8	5	4
Week 5 June 12	p53 and Apoptosis	Chapters 9	6	5
Week 6 June 19	Mid-term Exam Immortalization	Chapter 10	7	6
Week 7 June 26	Multi-step Tumorigenesis	Chapter 11	8	7
Week 8 July 3	Genomic Instability	Chapter 12	9	8
Week 9 July 23	Tumor Microenvironment, Heterotypic Interactions, Angiogenesis Invasion and Metastasis	Chapter 13, 14	10	9
Week 10 July 31	Tumor Immunology and Immunotherapy Tumor Detection, Diagnostics, and Screening	Chapter 15	11	10
Week 11 Aug. 7	Therapeutics: Surgery, Chemotherapy, Radiation, and Complementary Medicine Cancer Prevention Presentations	Chapter 16	12	11
Week 12 Aug. 14	Final exam Presentations	Chapter 16	13	12

GENERAL POLICIES

Classroom Decorum:

During lectures, please do not talk to your fellow students. Questions are, of course, encouraged throughout the class.

During discussions, please listen to others, do not interrupt and treat others with respect.

Cell Phone Policy:

Please turn off your cell phones. In exceptional cases, you may turn your cell phone to vibrate if expecting a critical call. If you need to answer a call, please step out of the classroom. Any student who disrupts class with a call may be asked to leave the classroom for the duration of that class.

SAFETY AND EMERGENCY PREPAREDNESS

MSU Police

URL: <http://police.msu.edu/>

1120 Red Cedar Rd East Lansing, MI 48824

Tel.: 517-355-2221

Email: info@police.msu.edu

A Note on Sexual Misconduct

Our school is committed to fostering a safe, productive learning environment. Title IX and our school policy prohibits discrimination on the basis of sex. Sexual misconduct — including harassment, domestic and dating violence, sexual assault, and stalking — is also prohibited at our school.

Our school encourages anyone experiencing sexual misconduct to talk to someone about what happened, so they can get the support they need and our school can respond appropriately.

If you wish to speak confidentially about an incident of sexual misconduct, want more information about filing a report, or have questions about school policies and procedures, please contact our Title IX Coordinator, which can be found on our school's website.

Our school is legally obligated to investigate reports of sexual misconduct, and therefore it cannot guarantee the confidentiality of a report, but it will consider a request for confidentiality and respect it to the extent possible.

As a teacher, I am also required by our school to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident.