

# CB7220 Course Syllabus

## Course information

**Course title:** Molecular Biology of Cancer Development

**Subject area code:** Cancer Biology (CB)

**Course number:** 7220

**Course section:** N/A

**Meeting day/time:** Mondays and Wednesdays 10:30 am-12:10 pm

**Credit hours:** 4

**Course format:** In-person

**Methods of instruction:** Lecture, paper discussion and student led presentations.

**Location:** Elliman, first floor conference room (Room 1124)

## Faculty contact information

Course Director: Malathy Shekhar, Ph.D.

Department of Oncology

Office: Elliman Building, 421 East Canfield, Room 1148, Detroit, MI

Email: malathy.puthan.shekhar@wayne.edu

Co-Director: Kay-Uwe Wagner, Ph.D.

Department of Oncology

Office: Elliman Building, 421 East Canfield, Room 1122, Detroit, MI

Email: kuwagner@wayne.edu

Co-Director: Benjamin Kidder, Ph.D.

Department of Oncology

4100 John R, HWCRC 624, Detroit, MI 48201

Email: benjamin.kidder@wayne.edu

## Course materials

### Required textbook(s)

Articles and lecture notes will be posted on Canvas.

### Library material(s)

N/A

## Required and optional readings for assignments and exams

N/A

## Course details

### Description

This 4-credit course will apply the broad range of expertise of faculty members in the Cancer Biology Graduate Program to advance the students' understanding of the molecular basis of cancer and practical technologies used for investigating cancer development. Core topics covered will include genome regulation, epigenetics, chromosome structure, chromatin remodeling mechanisms, regulatory RNAs, DNA damage response and repair, protein modifications, ubiquitin-proteasome, and molecular biology of autophagy. Students will be exposed to routine and recent advances in molecular biology techniques, protein modeling, and genetic engineering of models for investigating cancer development. Group discussion of journal articles will be organized to enable understanding of methodologies, experimental design, hypothesis testing, and data analysis and interpretation.

### Prerequisites

CB7210 "Fundamentals of Cancer Biology" is strongly recommended by the instructor.

### Learning outcomes

On successful completion of this course, students should be able to:

- Connect the contributions and interplay of genes and epigenetics in cancer development and progression
- Gain knowledge of methodologies, their advantages and limitations, and data interpretation
- Design experiments for answering research questions relevant to cancer development
- Critically analyze published papers, and develop skills in written and verbal communication of scientific data

### Course policies, Grading policies and attendance

#### Course Policies

- Students should regularly check their email and the Canvas for assignments or other course related communication.
- Participants should read the articles assigned for group discussion prior to the class.
- Students are expected to take responsibility for class material if he/she was unable to attend.

#### Grading policy

Grades will be based on scores from two written exams each given at the end of Blocks 1 and 2 (70%), and student presentation and in-class participation in paper discussion (30%).

	% of total grade
Exams	70%
Student presentation and in-class participation	30%
<b>Total</b>	<b>100%</b>

<b>Final Grade (%)</b>	<b>Letter Grade</b>
95-100	A
90-94.99	A-
85-89.99	B+
80-84.99	B
75-79.99	B-
<75	other

## Attendance

Class attendance is mandatory; however, exceptions will be made for reasons including illness, family emergency, or prior commitments for conference attendance. Unexcused absences will result in a reduced classroom participation score at the instructor's discretion, and negatively impact the overall grade.

## Course schedule

Mon & Wed	TOPIC	Instructor	Contact#
	<b>Block 1</b>		
<b>Week 1</b>	<b>Cell cycle and checkpoint regulation</b> DNA replication DNA damage response and repair	Brush	
<b>Week 2</b>	<b>Transcription regulation</b> Transcription factors, promoter usage, splice variants	Wilson	
<b>Week 3</b>	<b>Protein modifications and regulation</b> Ubiquitin/proteasome/PROTAC engineering	Xie	
<b>Week 4</b> <b>Mon</b>	<b>Protein structure prediction/modeling (Alphafold)</b>	TBD	
<b>Wed</b>	<b>Molecular biology of autophagy</b>	GS Wu	
<b>Week 5</b> <b>Mon</b>	<b>Block 1 Exam</b>		
	<b>Block 2</b>		
<b>Week 5</b> <b>Wed</b>	<b>Genetics</b> - Chromosome structure, abnormalities and cancer syndromes	TBD	
<b>Week 6</b> <b>Mon</b>			
<b>Week 6</b> <b>Wed</b>	Mutations and drug resistance	Zhang	
	<b>Epigenetics - Control of gene expression</b>	Guojun Wu	
<b>Week 7</b> <b>Mon</b>	DNA methylation/demethylation		
<b>Week 7</b> <b>Wed</b> <b>Week 8</b> <b>Mon</b>	Histone modifications, chromatin remodeling	Kidder	
<b>Week 8</b> <b>Wed</b> <b>Week 9</b> <b>Mon</b>	Regulatory noncoding RNAs	Shekhar	
<b>Week 9</b> <b>Wed</b>	<b>Block 2 Exam</b>		

	<b>Block 3</b>		
	<b>Molecular technologies and paper discussion</b>		
<b>Week 10 Mon</b>	Basic techniques	TBD	
<b>Week 10 Wed</b>	Engineering models for investigating cancer	Valdivia-Fernandes	
<b>Week 11 Mon</b>	CrispR-based gene editing	Wagner	
<b>Week 11 Wed</b>	Functional genomic techniques	TBD	
<b>Week 12 Mon</b>	Functional genomic techniques	TBD	
<b>Week 12 Wed</b>	Spatial omics	TBD	
<b>Week 13 Mon</b>	Proteome analysis	TBD	
<b>Week 13 Wed</b>			

## Class recordings

Students need prior written permission from the instructor before recording any portion of this class. If permission is granted, the audio and/or video recording is to be used only for the student's personal instructional use. Such recordings are not intended for a wider public audience, such as postings to the internet or sharing with others. Students registered with Student Disabilities Services (SDS) who wish to record class materials must present their specific accommodation to the instructor, who will subsequently comply with the request unless there is some specific reason why s/he cannot, such as discussion of confidential or protected information. Violations of this syllabus policy may result in charges under the student code of conduct.

## Religious holidays (from the online Academic Calendar)

Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

## Land acknowledgement

Wayne State University rests on Waawiyaataanong (Waa-we-yaa-tih-nong), also referred to as Detroit, the ancestral and contemporary homeland of the Three Fires Confederacy. These sovereign lands were granted by the Ojibwe (Oh-jib-way), Odawa (Oh-daa-waa), Potawatomi (Pow-tuh-waa-tuh-mee), and Wyandot nations, in 1807, through the Treaty of Detroit. Wayne State University affirms Indigenous sovereignty and honors all tribes with a connection to Detroit. With our Native neighbors, WSU can advance educational equity and promote a better future for the earth and all people.

## Student Disability Services

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. Please visit <https://studentdisability.wayne.edu> to register your condition. Once you have accommodations in place, please inform your instructor. Student Disability Services' mission is to assist the University in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at WSU. SDS supports students with a variety of conditions, such as mental health disorders, learning disabilities, chronic health conditions, etc.

## Counseling and Psychological Services (CAPS)

It is quite common for college students to experience mental health challenges, such as stress, anxiety, and depression, that interfere with academic performance and negatively impact daily life. Help is available for any currently enrolled WSU student who is struggling with a mental health difficulty. Go to <https://caps.wayne.edu> for information on the services offered and how to access them. Other options, for students and non-students, include the [Mental Health and Wellness Clinic at the College of Education \(https://education.wayne.edu/mental-health-and-wellness-clinic\)](https://education.wayne.edu/mental-health-and-wellness-clinic). Services at all these clinics are free and confidential. Remember that getting help, before stress reaches a crisis point, is a smart and courageous thing to do – for yourself, and for those you care about. CAPS provides afterhours/weekend crisis support: students living on campus can call (313) 577-2277, and all others, call (313) 577-9982. In a life-threatening emergency, call the WSU Police at 313-577-2222.

## Sexual Misconduct and Title IX

Most faculty and staff are considered “**Responsible Employees**” and are **required to report** information they receive about incidents of sexual misconduct (including sexual assault, stalking, dating/domestic violence, and sexual harassment) to the Title IX Coordinator when it involves a student.

**Confidential support** is available 24/7 through the [Rape, Abuse & Incest National Network \(RAINN\) \(https://www.rainn.org/\)](https://www.rainn.org/). Call **1-800-656-4673** or [Chat \(https://hotline.rainn.org/online\)](https://hotline.rainn.org/online) with a professional support specialist.

## Options for Self-Reporting Sexual Misconduct

Any student impacted by sexual misconduct or sexual harassment has the right to report to the University (i.e., Responsible Employee or Title IX Coordinator), to law enforcement (i.e., WSUPD or other jurisdiction), to both, or to neither. Every Warrior is encouraged to make the reporting decision that is right for them.

### *Reporting to the University*

The [Title IX Office \(https://titleix.wayne.edu/\)](https://titleix.wayne.edu/) is available to consult with individuals impacted by sexual violence or discrimination regarding resource referrals, supportive and protective measures, and reporting and resolution options. Where WSU has jurisdiction, the affected party may request an administrative investigation by the University.

**Phone:** 313-577-9999

**Email:** [TitleIX@wayne.edu](mailto:TitleIX@wayne.edu)

### *Reporting to Law Enforcement*

The [WSU Police Department \(https://police.wayne.edu/\)](https://police.wayne.edu/) is available 24/7 to assist individuals reporting criminal activity or concerns on or near campus. Report off-campus incidents to the appropriate police jurisdiction. In the event of an emergency or imminent threat, reporting to the police is highly encouraged.

**Phone:** 313-577-2222

**Every Warrior has the right to live, learn, and work at WSU – free from Harassment or Discrimination.** If you or someone you know has been impacted by sexual violence or discrimination, please visit [TitleIX.wayne.edu](https://titleix.wayne.edu) to learn more about resources and support on campus and in the community.

## **Food Pantry and Basic Needs**

Wayne State has a food pantry, a free resource available for all students. See the hours on the website <https://thew.wayne.edu/pantry>.

Learning is always more challenging when you are struggling to meet basic needs. Wayne State recognizes that you may face a number of challenges during your time here, and we are here to support you. Any student who faces challenges securing food, housing, or medical care is encouraged to contact relevant university offices noted on the [Financial Aid website \(https://wayne.edu/financial-aid/\)](https://wayne.edu/financial-aid/) for support. You are also encouraged to contact Care, Support, and Intervention services in the Dean of Students Office (DOSO) for assistance with connecting to resources for basic needs. Students can call DOSO at 313-577-1010 or submit a [care referral form \(https://doso.wayne.edu/conduct/student-support-intervention\)](https://doso.wayne.edu/conduct/student-support-intervention).

## **Academic Dishonesty – Plagiarism and Cheating**

[Academic misconduct \(https://doso.wayne.edu/conduct/academic-misconduct\)](https://doso.wayne.edu/conduct/academic-misconduct) is any activity that tends to compromise the academic integrity of the institution or undermine the education process. Examples of academic misconduct include:

- **Plagiarism:** To take and use another's words or ideas as your own without appropriate referencing or citation.
- **Cheating:** Intentionally using or attempting to use or intentionally providing unauthorized materials, information, or assistance in any academic exercise. This includes copying from another student's test paper, allowing another student to copy from your test, using unauthorized material during an exam and submitting a term paper for a current class that has been submitted in a past class without appropriate permission.
- **Fabrication:** Intentional or unauthorized falsification or invention of any information or citation, such as knowingly attributing citations to the wrong source or listing a fake reference in the paper or bibliography.
- **Other:** Selling, buying, or stealing all or part of a test or term paper, unauthorized use of resources, enlisting in the assistance of a substitute when taking exams, destroying another's work, threatening, or exploiting students or instructors, or any other violation of course rules as contained in the course syllabus or other written information.

Such activity may result in failure of a specific assignment, an entire course, or, if flagrant, dismissal from Wayne State University.

## Course drops and withdrawals

For courses running the full term, students can drop this class and receive 100% tuition and course fee cancellation for the first two weeks. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can withdraw on [Academica \(https://academica.wayne.edu/\)](https://academica.wayne.edu/). You will receive a mark of W at the time of withdrawal. No withdrawals can be initiated after the deadline. Students enrolled beyond the deadline will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step, including speaking with your instructor or advisor. More information on course drops and withdrawals can be found on the [Registrar's website \(https://wayne.edu/registrar\)](https://wayne.edu/registrar). For classes that are shorter than the full term, deadlines for dropping and withdrawal can be found on the section's detail in the [Schedule of Classes \(https://registration.wayne.edu/\)](https://registration.wayne.edu/).

## Student Services

### The Academic Success Center

The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit the [Academic Success Center \(https://success.wayne.edu/\)](https://success.wayne.edu/) for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses).

### The Writing Center & Writer's Studio

The Writing Center provides a variety of tutoring options free of charge for graduate and undergraduate students at WSU. Tutoring sessions are available in the following modes:

- In-person during our Writer's Studio open hours (to learn more, please visit our website)
- Online, synchronous sessions (up to 50-minutes)
- Online, asynchronous sessions (please review our guidelines for asynchronous tutoring)

Tutoring services are provided by trained undergraduate and graduate student tutors. Our tutors assist with writing from all disciplines and on a range of topics including but not limited to: brainstorming, drafting, revising, organization, and editing. All tutoring sessions are collaborative, so please come prepared to work with your tutor (whether online or in-person). We look forward to working with you!

To schedule a one-on-one appointment, please visit our website: <https://writing.wayne.edu>

For in-person services or just a dedicated space to write and study, you're welcome to drop into our Writer's Studio any time during our regular business hours – no appointment necessary! You can find our current hours at our website: <https://writing.wayne.edu>

For more information about the Writing Center and Writer's Studio, please contact the Director, Amy Latawiec (email: [amy.latawiec@wayne.edu](mailto:amy.latawiec@wayne.edu))

### Library research assistance

The University Libraries are available 24x7 to help students locate and access articles, books, and other credible and reliable resources you need for your research papers and projects. Librarians can

also help you understand assignments and cite the articles and images that you use in your papers. You can connect with librarians at <https://library.wayne.edu/help> for chat, email, phone, drop-in hours, or appointments.