

Keck School of Medicine of USC

MEDS-445 Cancer Biology,

Prevention and Therapy in the Modern Era: From Bench to Bedside

Units: 4

Monday and Wednesday 1:00 pm to 2:50 pm

Location: DMC (Joseph Medicine Crow for International and Public Affairs)

Course Coordinators:

Course Coordinator: Professor Yves A. DeClerck MD, declerck@usc.edu

Coordinator Module 1, 2 and 6: Professor Abdullah Ladha MD, abdullah.Ladha@med.usc.edu

Coordinator Module 3: Professor Jennifer Unger PhD, junger@usc.edu

Coordinator Module 4: Professor James Amatruda MD, PhD, jamatruda@chla.usc.edu

Coordinator Module 5: Professor Shannon Mumenthaler PhD, smumenthaler@usc.edu

Course Description

Summary: Through interactive and engaging talks from a group of expert instructors, the course will provide students with a broad overview of cancer, including prevention, social issues, therapy, cancer biology and emerging new treatment approaches. This course is targeted to students interested in careers in health sciences from a multidisciplinary perspective.

Objectives: The course has two major objectives.

1. To give students an in-depth knowledge of fundamental and clinical aspects of cancer by exposing them to

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interactive lectures with a broad group of USC faculty from different disciplines and perspectives and make them appreciate the importance of convergent science in our efforts to tackle complex human diseases like cancer.

2. To give students an opportunity to discuss careers in cancer with clinical investigators, cancer researchers and cancer survivors at USC-Norris Comprehensive Cancer Center.

Organization: The course brings together a diverse group of USC faculty members committed to providing interactive and updated lectures.

The course is organized in six modules and a total of 25 submodules (classes)

Module 1: Clinical Presentations of Cancer: Melanoma, Leukemia and Lung Cancer.

Module 2: Current Cancer Treatments: Chemotherapy, Immunotherapy and Radiation Therapy

Module 3: Cancer Control and Prevention

Module 4: Cancer Biology

Module 5: Cancer Research

Module 6: Cancer Care and Careers in Cancer Health Care and Research

Learning Objectives:

1. Describe the different hallmarks on cancer and their fundamental mechanisms of action
2. Describe the contribution of data science and remote monitoring in the design and completion of population-based studies and intervention studies testing behavioral changes and cancer prevention
3. Describe how molecular biology and omics science have revolutionized our approach to cancer diagnosis and therapy and how such research has improved the health and survival of patients with cancer
4. Provide an understanding of the current approaches to cancer treatment including radiation therapy, chemotherapy, targeted therapy and immunotherapy and how biomarkers allow us to increasingly treat patients in a precise way (Precision medicine).
5. Provide an opportunity for students to meet PhD students and professionals who are dedicating their career to research and clinical oncology at USC.

Prerequisite(s):

BISC-220 or 221.

A solid knowledge and familiarity with molecular biology is recommended.

Course outline: Weekly Schedule Fall 2024: See table at end of syllabus

Communication:

All information regarding lectures, reading assignments, and homework will be posted on the Brightspace web site. Only students who are registered for the course will have access to the website. This course will be given on site although it may require familiarity with use of the Zoom video-conferencing platform as some lectures could be delivered online-only via Zoom, without concurrent meeting in the lecture hall. It also requires that enrolled students have secured individual access to the course on Brightspace and know how to navigate this educational technology.

USC Technology Support Links:

[Zoom information for students](#)
[Software available to USC Campus](#)

Suggested reading material during the course:

Articles:

Hallmarks of Cancer: New Dimensions. **Hanahan D.** Cancer Discov. 2022 Jan;12(1):31-46. .PMID: 35022204

Hallmarks of Cancer: The Next Generation. **Hanahan D,** Weinberg RA. Cell. 2011 Mar 4;144(5):646-74. doi: 10.1016/j.cell.2011.02.013.PMID: 21376230

Book:

The Emperor of all Maladies by Siddhartha Mukherjee

Description of Assessments

The following assessment tools will be used.

1. **Short quizzes during a lecture:** Each instructor will be asked to include short quizzes with questions related to the presentation, that students will answer.
2. **Homework reading:** Each lecture will include articles that students will be asked to read before the lecture. The instructor will include a series of questions that students will be expected to answer/discuss during the second hour of the lecture.
3. **Multiple choice questions:** At the end of module 3 and module 6, students will complete a formal exam related to the material presented during the 3 previous modules. Exams will consist of multiple-choice questions to test knowledge.

4. **Research paper and presentation:** Each student will be asked to write a comprehensive 3–4-page research paper on one of the main topics of the course. Assignments will be given 6 weeks ahead of time. Such a paper will include a review of the literature on the subject. Each student will present this paper in the form of a brief oral presentation to the entire class during the last class.

Participation/In-class work

Students must attend all class sessions on time for the entire class. They are expected to come prepared (i.e., have reviewed and understood the pre-class assignments) and actively participate in every class. Discussion is essential. Students are expected to be active participants to get full credit, reading all assigned papers and joining in the conversation with questions or comments as appropriate. Points lost from missing participation may be replaced by an appropriate written assignment if an excuse considered valid by faculty is presented in a timely fashion. All absences require acceptable written excuse or documentation. Students failing to show up to a lecture without a previous valid excuse communicated to the module coordinator, will receive a zero for participation to that specific class. For sessions on Zoom, students are expected to use a video camera and interact with the instructor.

Grading Breakdown

Assignment	% of Grade
Module Exams (2) (20% each)	40
Participation and attendance	15
Research paper and oral presentation	45 (25 written; 20 oral)
Total	100

Grading Scale

Course final grades will be determined using the following scale.

A	90-100
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	66-69
C	63-65
C-	60-62
D+	56-59
D	53-55
D-	50-52
F	49 and below

Course-specific Policies

Assignment Submission

All assignments (in-class work and presentation components) should be submitted through Brightspace. Student can get assistance on <https://www.brightspacehelp/students>

Grading Timeline

All graded work will be returned no later than 2 weeks from the submission deadline or exam date.

Late work

Late work will not be graded unless the student has a valid excuse and contacts the coordinator 2 days before the submission deadline.

Technology in the classroom

Technology including personal computers, tablets and smart phones should only be used with classroom activities. Familiarity with the Zoom video-conferencing platform and a working internet connection will be required for online sessions. Familiarity with USC's Blackboard sites is also required.

Academic integrity

A grade of zero will be applied to submitted work that does not comply with the USC standards of academic conduct. Such work may not be resubmitted for a new grade.

Classroom norms

You are encouraged to ask the instructor questions for clarification, both in class and outside of class, to promote better learning. You are encouraged to share your views in the classroom whenever appropriate. You should also be open to hearing diverse opinions and communication styles.

Zoom etiquette: In case a class is given on zoom, students will have to use their video-camera.

Sharing of course materials outside of the learning environment

USC has a policy that prohibits sharing of any synchronous and asynchronous course content outside of the learning environment.

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Course evaluation

Two surveys will gather student opinions about the course: An early informal evaluation through a meeting with the coordinator will take place after the first three classes and a more detailed written evaluation will take place at the end of the semester. Students will have to submit their evaluations before receiving their final grade. The opinion and constructive critiques from students are valued and can make a difference in how this course is conducted and improved.

Statement on Academic Conduct and Support Systems

[The current Statement on Academic Conduct and Support Systems is a required component of all USC syllabi and is updated regularly. Faculty should use the latest version of the Statement on Academic Conduct and Support Systems found in the [Curriculum Coordination Office's Syllabus Template](#). The Statement below is current as of Spring 2021.]

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in [SCampus in Part B, Section 11](#), “Behavior Violating University Standards.” Other forms of academic dishonesty are equally unacceptable. See additional information in [SCampus and university policies](#) on scientific misconduct.

Support Systems:

[Counseling and Mental Health](#)

phone number (213) 740-9355

On call 24/7

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[National Suicide Prevention Lifeline](#)

Phone number 1 (800) 273-8255

On call 24/7

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#)

Phone Number (213) 740-9355(WELL), press "0" after hours

On call 24/7

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

[USC Office of Equity, Equal Opportunity, and Title IX](#)

Phone number (213) 740-5086

Title IX Office (213) 821-8298

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#)

Phone number (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity, Equal Opportunity, and Title IX for appropriate investigation, supportive measures, and response.

[The Office of Disability Services and Programs](#)

Phone number (213) 740-0776

Support and accommodation for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

[USC Campus Support and Intervention](#)

Phone number (213) 821-4710

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity at USC](#)

Phone number (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#)

UPC phone number (213) 740-4321

HSC phone number (323) 442-1000

On call 24/7

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#)

UPC phone number (213) 740-6000

HSC phone number (323) 442-120

On call 24/7

Non-emergency assistance or information.

MEDS-445 Cancer Biology, Prevention and Therapy in the Modern Era: From Bench to Bedside						Monday and
Wednesday 1:00 pm to 2:50 pm						
Location: DMC (Joseph Medicine Crow for International and Public Affairs) Room						
MEDS 445 Schedule 2024	Module	Topic	Coordinator	Submodule	Topic	Instructor
Monday, August 26, 2024	Module 1	Clinical Aspects	A. Ladah MD	Submodule1	Melanoma	James Hu MD
Wednesday, August 28, 2024	Module 1	Clinical Aspects	A. Ladah MD	Submodule2	Leukemia	George Yaghmour MD
Monday, September 2, 2024					Labor Day	
Wednesday, September 4, 2024	Module 1	Clinical Aspects	A. Ladah MD	Submodule 3	Lung Cancer	Jorge Nieva MD
Monday, September 9, 2024	Module 1	Course Overview, Expectations	Y. DeClerck MD	Submodule 4	History of Cancer Therapy	Yves DeClerck MD
Wednesday, September 11, 2024	Module 2	Current Cancer Therapy	A. Ladah MD	Submodule 1	Chemotherapy	Houda Alachkar PhD
Monday, September 16, 2024	Module 2	Current Cancer Therapy	A. Ladah MD	Submodule 2	Immunotherapy	Sandra Algaze MD
Wednesday, September 18, 2024	Module 2	Current Cancer Therapy	A. Ladah MD	Submodule 3	Radiation Therapy	Lauren Lukas MD
Monday, September 23, 2024	Module 3	Cancer Control and Prevention	J. Unger PhD	Submodule 1	Melanoma prevention	Myles Cockburn PhD
Wednesday, September 25, 2024	Module 3	Cancer Control and Prevention	J. Unger PhD	Submodule 2	Smoking and Cancer	Alyssa Harlow PhD
Monday, September 30, 2024	Module 3	Cancer Control and Prevention	J. Unger PhD	Submodule 3	Obesity and Cancer	Britni Belcher PhD, MPH
Wednesday, October 2, 2024	Module 3	Cancer Control and Prevention	J. Unger PhD	Submodule 4	Ancestry, Diversity and Cancer	Charite Ricker MS
Monday, October 7, 2024					First Mid Term Exam	J. Unger and A. Ladha
Wednesday, October 9, 2024	Module 4	Cancer Biology	J. Amatruda MD, PhD	Submodule 1	The Cancer Cell: Genomic instability	Jessica Tsai MD, PhD
Monday, October 14, 2024	Module 4	Cancer Biology	J. Amatruda MD, PhD	Submodule 2	The Cancer Cell : Proliferation vs Differentiation	James Amatruda MD, PhD
Wednesday, October 16, 2024	Module 4	Cancer Biology	J. Amatruda MD, PhD	Submodule 3	Inflammation and Immune Control	Keyue Chen PhD
Monday, October 21, 2024	Module 4	Cancer Biology	J. Amatruda MD, PhD	Submodule 4	Metastasis and Angiogenesis	Josh Ebrahim-Neman PhD
Wednesday, October 23, 2024	Module 5	Cancer Research	S. Mumenthaler PhD	Submodule 1	Engineered cancer models	Shannon Mumenthaler PhD
Monday, October 28, 2024	Module 5	Cancer Research	S. Mumenthaler PhD	Submodule 2	Drugs: From discovery to development	Steve Kay PhD
Wednesday, October 30, 2024	Module 5	Cancer Research	S. Mumenthaler PhD	Submodule 3	Theranostics	Cristina Zavaleta PhD
Monday, November 4, 2024	Module 5	Cancer Research	S. Mumenthaler PhD	Submodule 4	Multi-Omics	Jonathan Katz PhD
Wednesday, November 6, 2024	Module 5	Cancer Research	S. Mumenthaler PhD	Submodule 5	Systems biology to design effective therapies	Stacey Finley PhD
Monday, November 11, 2024					Veterans Day	
Wednesday, November 13, 2024	Module 5	Cancer Research	S. Mumenthaler PhD	Submodule 6	Big Data, Machine Learning and AI	Jerry Lee PhD
Monday, November 18, 2024	Module 6	Cancer Care	A. Ladah MD	Submodule 1	Precision Medicine in Cancer	Raghuveer Ranganathan MD
Wednesday, November 20, 2024	Module 6	Cancer Care	A. Ladah MD	Submodule 2	Ethical issues and end of life	Abdullah Ladha MD
Monday, November 25, 2024	Module 6	Cancer Care	A. Ladah MD	Submodule 3	Cancer Therapy: Biomarker led clinical trials.	Kevin Kelly MD
Wednesday, November 27, 2024					Thanksgiving Holiday	
Monday, December 2, 2024	Module 6	Cancer Care	Y. DeClerck MD	Submodule 4	Dialogue with survivors	Yves DeClerck MD and Mary Aalto
Wednesday, December 4, 2024	Module 6	Cancer Care	Y. DeClerck MD	Submodule 5	Visit at USC-NCCC 6.00 - 7.30 PM	Yves DeClerck MD
Friday, December 6, 2024					Class ends	
Wednesday, December 11, 2024					Second Mid-Term Exam	J. Amatruda, S. Mumenthaler and A. Ladha
Monday, December 16, 2024	Final Exam				Final Exam Students' Oral Presentations	Y. DeClerck