IMPORTANT: This syllabus form should be submitted to OAA (gsbs_academic_affairs@uth.tmc.edu) a week before the start of each semester.

NOTE to STUDENTS: If you need any accommodations related to attending/enrolling in this course, please contact one of the Graduate School's 504 Coordinator, Natalie Sirisaengtaksin, PhD. We ask that you notify GSBS in advance (preferably at least 3 days before the start of the semester) so we can make appropriate arrangements.

Term and Year: **Fall 2026** Course Number and Course Title: **GS04 1213: Mechanisms in Cancer Therapeutics** Credit Hours: **3** Prerequisite: **Background in Biochemistry and Cell Biology** Meeting Location: **UT MD Anderson Cancer Center** Building/Room#: **BSRB S3.8351 (Mon)** **BSRB S3.8371 (Thurs)**	Program Required Course: **No** Approval Code: **No** Audit Permitted: **Yes** Classes Begin: **August 31, 2026** Classes End: **December 10, 2026** Exams: **December 14, 2026**

Class Meeting Schedule

Day	Time
Monday **Thursday**	**1:00 pm – 3:00 pm** **3:00 pm – 4:00 pm**

Course Director

Name and Degree: **Federica Pisaneschi, PhD**

Title: **Assistant Professor**

Department: **Institute of Molecular Medicine**

Institution: **UTHH**

Email Address: Federica.Pisaneschi@uth.tmc.edu

Contact Number: **713-500-5583**

NOTE: Office hours are available by request. Please email me to arrange a time to meet.

Teaching Assistants:

Tyler Bateman
Tyler.Bateman@uth.tmc.edu

Sydney Wilbon
Sydney.S.Wilbon@uth.tmc.edu

Instructors

See attached course outline

Course Description:
This course will establish a foundation of the principles of cancer therapy, including pharmacologic rationales, consideration of biological targets, and mechanism-based approaches to combinations. A major emphasis will be placed on agents that damage DNA, and the response of tumor cells to such insults. In-depth presentations will consider all classes of chemotherapeutic agents, their metabolism, and mechanisms of action, and the resistance mechanisms of tumor cells. Mechanistic rationales for other therapeutic modalities used for cancer treatment such as radiotherapy, gene therapy, and immunotherapy will also be covered. Students will have the opportunity to learn to identify novel therapeutic targets, and the procedures used to develop new agents for clinical evaluation.

Textbook/Supplemental Reading Materials

- Reference Book: Cancer Chemotherapy and Biotherapy: Principles and Practice, by Bruce A. Chabner MD, Dan L. Longo MD

Course Objective/s: Upon successful completion of this course, students will…

***Specific Learning Objectives*:**

1. Learn the mechanisms of action of chemotherapeutic drugs that target DNA replication, transcription, alternative splicing, translation, mitosis, cell sycly, ribononucleotide reductase, folate metabolism, and nucleosides.
2. Learn different ways in which immunologic components can be used in the treatment and prevention of malignancy.
3. Learn how cancer-associated signaling pathways can be targeted and how cells adapt and generate resistance mechanisms.
4. Learn the mechanisms of action of agents that directly damage DNA, how different types of DNA damage are repaired, how cells respond to DNA damage, and how this process can be targeted for therapeutic intent.
5. Learn the interactions of tumor cells with their microenvironment and how this can be targeted for therapeutic intent.

Student Responsibilities and Expectations:

1. Read, process, and review (study) material provided by the lecturers
2. Read research articles (e.g., primary research) when suggested by lecturers
3. Prepare for and take course quizzes based on course lectures/ readings.
4. Participate in and contribute to course discussions during lecture, review sessions
5. Prepare for and take a final examinations based on lecture and some reading material

Students are expected to complete all assigned reading material (reviews and research literature) prior to class. While you may work and discuss all course materials and assignments in groups, all writing assignments must be your own. Plagiarism and failure to properly cite scientific literature and other sources will not be tolerated and are grounds for dismissal from the course and further GSBS disciplinary action. Cheating or engaging in unethical behavior during examinations (quizzes and final) will be grounds for dismissal from the course without credit and further GSBS disciplinary action.

Grading System: **Letter Grade (A-F)**	
Student Assessment and Grading Criteria :	
Percentage	**Description**
Homework (30 %)	3 Take Home assignments (2 Essay questions each)
Exams (30%)	3 MCQs in class exams
Participation and/or Attendance (10%)	>85% class attendance/participation

CLASS SCHEDULE

Date	Duration (Hour(s) taught by lecturer)	Lecture Topic	Lecturer/s
Mon, August 31, 2026	1	Introduction to Cancer Therapeutics	Tim Heffernan
Mon, August 31, 2026	1	Cell Cycle	Majid Momeny
Thurs, September 3, 2026	1	Ribonucleotide Reductase & Deoxynucleotides	Varsha Gandhi
Mon, September 7, 2026	-	Labor Day Holiday	No Class
Thurs, September 10, 2026	1	Review of 5-Fluorouracil Mechanism	Sunil Krishnan
Mon, September 14, 2026	1	Nucleoside Analogs	Sunil Krishnan
Mon, September 14, 2026	1	Alkylating Agents, Cisplatin and Analogs	Steven Milward
Thurs, September 17, 2026	1	Topoisomerase Inhibitors	Yuri Mackeyev
Mon, September 21, 2026	1	Radiotherapy	Ryan Park
Mon, September 21, 2026	1	ROS: Generation, Toxicity, & Drug Target	Scott Bright
Thurs, September 24, 2026	1	Radioisotopes in Cancer Therapy	Federica Pisaneschi
Mon, September 28, 2026	1	Synthetic Lethality, PARP inhibition, and Other Strategies	Tim Yap

Mon, September 28, 2026	1	Radiotracers in Molecular Imaging	Federica Pisaneschi
Thurs, October 1, 2026	1	Cell Death Mechanisms Enhancement	Joya Chandra
Mon, October 5, 2026	1	Radiopharmaceutical Therapies	Cheenu Kappadath
Mon, October 5, 2026	1	Antibody Drug Conjugates	Kendra Carmon
Thurs, October 8, 2026	-	Exam I	N/A
Mon, October 12, 2026	1	Innovation in KRAS Therapeutics	Tim Heffernan
Mon, October 12, 2026	1	Targeting The ER and HER2 Receptors in Breast Cancer	Majid Momeny
Thurs, October 15, 2026	1	Angiogenesis	Joe McCarty
Mon, October 19, 2026	1	Aurora Kinase Inhibition	Faye Johnson
Mon, October 19, 2026	1	Targeting B Cell Receptor Signaling; Microenvironment	Jan Burger
Thurs, October 22, 2026	1	Targeting The Androgen Receptor: Prostate Cancer Applications	Tim Thompson
Mon, October 26, 2026	1	Targeting PI3K Pathway	Senthil Damodaran
Mon, October 26, 2026	1	Targeting the EGF Receptor	John Heymach
Thurs, October 29, 2026	1	Protein Ubiquitination; Proteasome Inhibitors; Degrons	Andrew Pickering
Mon, November 2, 2026	1	Autophagy	Nancy Gordon
Mon, November 2, 2026	1	Epigenetically Directed Cancer Therapeutics	Deepa Sampath
Thurs, November 5, 2026	-	Exam II	N/A
Mon, November 9, 2026	1	TP53: The Guardian of The Genome, and Beyond	Hussein Abbas
Mon, November 9, 2026	1	Targeting the MAPK Pathway in Melanoma	Rodabe Amaria
Thurs, November 12, 2026	1	Teaching Assistant Lecture	TA

Mon, November 16, 2026	2	Targeting Cancer Metabolism	Eyal Gottlieb
Thurs, November 19, 2026	1	Targeting BET Family Proteins: Flunking a Good Reader	Ghayas Issa
November 23-27, 2026	-	Thanksgiving Holiday	No Class
Mon, November 30, 2026	1	Transcription, Gene Expression and Silencing	Kunal Rai
Mon, November 30, 2026	1	Checkpoint Inhibition Strategies	Michael Curran
Thurs, December 3, 2026	1	NK Cell Therapies	May Daher
Mon, December 7, 2026	1	Immunology, Cellular Therapy and Stem Cell Transplant	Gheath Al-Atrash
Mon, December 7, 2026	1	CAR-T Cell Therapy	Hind Rafei
Thurs, December 10, 2026	1	TBD	TBD
Mon, December 14, 2026	-	Exam III	N/A

NOTE: Lecturers will provide their talks' slides before the lecture take place. Lecturers will be asked to provide reading material relevant to their topics.

FP/TB/jal-07.22.26