

**IMPORTANT:** This syllabus form should be submitted to OAA ([gsbs\\_academic\\_affairs@uth.tmc.edu](mailto: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.

<p>Term and Year: <b>Fall 2025</b></p> <p>Course Number and Course Title: <b>GS04 1213: Mechanisms in Cancer Therapeutics</b></p> <p>Credit Hours: <b>3</b></p> <p>Meeting Location: <b>Schissler Library</b></p> <p>Building/Room#: <b>BSRB S3.8351</b></p> <p>WebEx/Zoom Link: <b>TBD</b></p>	<p>Program Required Course: <b>No</b></p> <p>Approval Code: <b>No</b></p> <p>Audit Permitted: <b>Yes</b></p> <p>Classes Begin: <b>Monday August 25, 2025</b></p> <p>Classes End: <b>Friday, December 5, 2025</b></p> <p>Exams: <b>10/3/25 (topics 1-4), 11/14/25 (topics 5-6), 12/8/25 (topic 7-8)</b></p>
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**Class Meeting Schedule**

Day	Time
Mon, Fri	2:00 pm – 4:00 pm, 3:00 pm – 4:00 pm

<p><b>Course Director</b></p> <p>Name and Degree: <b>Federica Pisaneschi, PhD</b></p> <p>Title: <b>Assistant Professor</b></p> <p>Department: <b>Institute of Molecular Medicine</b></p> <p>Institution: <b>UTHH</b></p> <p>Email Address: <a href="mailto:Federica.Pisaneschi@uth.tmc.edu">Federica.Pisaneschi@uth.tmc.edu</a></p> <p>Contact Number: <b>713-500-5583</b></p> <p><b>NOTE:</b> Office hours are available by request. Please email me to arrange a time to meet.</p> <p><b>Teaching Assistants:</b></p> <p>Tyler Bateman 3<sup>rd</sup> Year GSBS PhD Student <a href="mailto:Tyler.Bateman@uth.tmc.edu">Tyler.Bateman@uth.tmc.edu</a></p>	<p><b>Instructors</b></p> <p><b>See attached course outline</b></p>
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Jack Adams  
3<sup>rd</sup> Year GSBS PhD Student  
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**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 (if any)**

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 cycle, ribonucleotide 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
<b>Homework (30 %)</b>	3 Take Home assignments (2 Essay questions each)
<b>Exams ( 30%)</b>	3 MCQs in class exams
<b>Participation and/or Attendance ( 10%)</b>	>85% class attendance/participation

**CLASS SCHEDULE** (See attached tentative schedule. Please note that the faculty assigned to teach the lecture may still be changed.)

Date	Duration (Hour(s) taught by lecturer)	Lecture Topic	Lecturer/s
		<b>SEE FILE</b>	

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

# MECHANISMS IN CANCER THERAPEUTICS – GS04-1213

## FALL SEMESTER 2025

*Semester starts on Monday, August 25, 2025*

*Dates and time Monday 2:00 pm – 4:00 pm*

*and Friday, 3:00 pm – 4:00 pm*

*Room BSRB S3.8351, Schissler Library*

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### Course Requirements:

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

<u>Date</u>	<u>Lecture Title</u>	<u>Instructor</u>
<b><u>Module I</u></b>		
<b>Cellular Processes, Targeting Cellular Events</b>		
Mon, August 25, 2025	Cell Cycle	Majid Momeny
Tuesday, August 26, 2025	Introduction to Cancer Therapeutics	Tim Heffernan
Fri, August 29, 2025	Ribonucleotide Reductase & Deoxynucleotides	Varsha Gandhi
<b>Mon, September 1, 2025</b>	<b>Labor Day Holiday - No Class</b>	
Fri, September 5, 2025	An Introduction to Cancer Epigenetics	Kunal Rai
Mon, September 8, 2025	Review of 5-Fluorouracil mechanism	Sunil Krishnan
Mon, September 8, 2025	Nucleoside Analogs	Varsha Gandhi
Fri, September 12, 2025	Alkylating Agents, Cisplatin and Analogs	Steven Milward
Mon, September 15, 2025	Topoisomerase Inhibitors	Yuri Mackeyev
<b>ROS &amp; Cell Death:</b>		
Mon, September 15, 2025	Radioisotopes in Cancer Therapy	Federica Pisaneschi
Fri, September 19, 2025	ROS: Generation, Toxicity, & Drug Target	Scott Bright
<b>Radiotherapy, DNA Damage and Repair</b>		
Mon, September 22, 2025	Radiotherapy	Ryan Park
Mon, September 22, 2025	Synthetic Lethality, PARP inhibition, other strategies	Tim Yap
Fri, September 26, 2025	Radiotracers in Molecular Imaging	Federica Pisaneschi
Mon, September 29, 2025	Cell Death Mechanisms Enhancement	Joya Chandra
Mon, September 29, 2025	Radiopharmaceutical therapies	Cheenu Kappadath
<b>Fri, October 3, 2025</b>	<b>Exam I</b>	
<b><u>Module II</u></b>		
<b>Aberrant Kinases, Receptor Signaling, Tissue Physiology and Angiogenesis</b>		
Mon, October 6, 2025	Antibody Drug Conjugates	Kendra Carmon
Mon, October 6, 2025	Innovation in KRAS Therapeutics	Tim Heffernan

Fri, October 10, 2025	TKI design	TBD
Mon, October 13, 2025	Targeting the ER and HER2 Receptor in Breast Cancer	Majid Momeny
Mon, October 13, 2025	Angiogenesis	Joe McCarty
Fri, October 17, 2025	Aurora Kinase Inhibition	Faye Johnson
Mon, October 20, 2025	Targeting B Cell Receptor Signaling; Microenvironment	Jan Burger
Mon, October 20, 2025	Targeting the Androgen Receptor: Prostate Cancer Applications	Tim Thompson
Fri, October 24, 2025	Targeting PI3K Pathway	Senthil Damodaran
Mon, October 27, 2025	Targeting Cancer Metabolism	Eyal Gottlieb
<b>Friday, October 31, 2025</b>	<b>TAP retreat</b>	
Mon, November 3, 2025	Targeting the MAPK Pathway in melanoma	Rodabe Amaria
Mon, November 3, 2025	Autophagy	Nancy Gordon
Fri, November 7, 2025	Targeting the EGF Receptor	John Heymach
Mon, November 10, 2025	Epigenetically Directed Cancer Therapeutics	Deepa Sampath

### **Module III**

#### **Transcription & Translation**

Mon, November 10, 2025	Transcription, Gene Expression and Silencing	Kunal Rai
<b>Fri, November 14, 2025</b>	<b>Exam II</b>	
Mon, November 17, 2025	Protein Ubiquitination; Proteasome Inhibitors; Degrons	Andrew Pickering
Mon, November 17, 2025	TP53: The Guardian of the Genome, and Beyond	Hussein Abbas
Fri, November 21, 2025	Targeting BET Family Proteins: Flunking a Good Reader	Gautam Borthakur
Mon, November 24, 2025	Teaching Assistant Lecture	Teaching Assistant

#### **Immune Therapies**

Mon, November 24, 2025	Checkpoint Inhibition Strategies	Michael Curran
<b>Fri, November 28, 2025</b>	<b>Thanksgiving Holiday - No Class</b>	
Mon, December 1, 2025	NK Cell Therapies	May Daher
Mon, December 1, 2025	Immunology, Cellular Therapy and Stem Cell Transplant	Gheath Al-Atrash
Fri, December 5, 2025	CAR-T cell therapy	Hind Rafei
<b>Mon, December 8, 2025</b>	<b>Exam III</b>	

**GS04 1213: Mechanisms in Cancer Therapeutics**

<b>LIST OF FACULTY</b>		<b>Faculty Assistant</b>
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