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 Coordinators, Cheryl Spitzenberger or Natalie Sirisaengtaksin. 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: **Spring 2024** Course Number and Course Title: **GS04 1235: Basic and Translational Cancer Biology** **Credit Hours: 5** Meeting Location: **UT MD Anderson Cancer Center** Basic Science Research Building Bldg./Room#: **BSRB S3.8371 (GSBS Large Classroom) and BSRB S3.8112 (Computer Lab)**	Program Required Course: **Yes** Approval Code: **No** Audit Permitted: Y**es** Classes Begin: **January 8, 2024** Classes End: **April 29, 2024** Final Exam Week: **April 29 – May 3, 2024**

Class Meeting Schedule

	Day	Time
Lecture	**Monday**	**5:00-7:00PM (First Class, 4:30-700)**
Review	**Friday**	**11:00 AM-12:00 PM**

Course Director Name and Degree: **Jian Hu, PhD** Title: Associate Professor Department: Cancer Biology Institution: *MDACC* Email Address: Jhu3@mdanderson.org Contact Number: 713-794-5238 **Course Co-Director/s:** Name and Degree: **Haoqiang Ying, PhD** Title: Associate Professor Department: Molecular and Cellular Biology Institution: *MDACC* Email Address: HYing@mdanderson.org Contact Number: (713) 563-3367	**Instructor/s** (See attached class schedule)

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

Teaching Assistant: **N/A**

Course Description:

This Cancer Biology Core course aims to consolidate essential knowledge of human cancer biology, providing insights into disease development, multifaceted molecular signatures, diagnostics, and therapeutics. It will utilize seminal articles in the field of cancer biology, primary research publications, and incorporate the expertise of GSBS faculty to convey foundational information and the latest advancements in basic, translational, and clinical cancer research.

Textbook/Supplemental Reading Materials

- **N/A**

Course Objective/s:

After successfully completing this course, students will possess a fundamental understanding of the molecular and cellular underpinnings of cancer, as well as a comprehensive grasp of the historical and contemporary aspects of cancer research.

***Specific Learning Objectives*:**

1. Build knowledge and understanding of cellular and molecular origins of cancer, and foundational drivers and suppressors of tumorigenesis

2. Identify seminal signaling pathways and important molecular players in cancer development and progression

3. Describe tumor progression and important 'hallmarks' of cancer

4. Distill scientific literature into key elements and findings, identify shortcomings, and propose future directions.

5. Apply the current cancer biology knowledge to propose new hypotheses and experiments to test them.

6. Describe the standard of care and applications of basic and translational research.

Student responsibilities and expectations:

Students enrolled in this course will be expected to perform the following activities each week.

1. Read, process, and review (study) material from 1 or 2 seminal reviews relating to the week's cancer biology topic
2. Read 2 research articles (e.g., primary research)
3. Write 2 one-page literature synopses for the assigned research articles (see **Course Grading** for more detail)
4. Prepare for and take course quizzes based on course lectures/ readings.
5. Attend and participate at the journal club review session
6. Participate in and contribute to course discussions during lecture, review sessions
7. Prepare for and take a final examination 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 total of 574 points is available during the course. Your grade will be determined by the following items.)

Percentage	Description
Literature Synopses (68%)	For each day of lecture, students will be assigned 2 seminal papers to critically read. Students will write a one page synopsis for each paper and 1) describe key findings, 2) identify any scientific/technological advances and/or short comings in the paper, and 3) suggest 1-2 future studies based on the findings in the paper that are supported by further independent research by the student. The students will have one week to complete each synopses. (390 points possible; 15 per synopses)
Final Exam (11%)	Will be comprehensive on materials from the whole of the course (i.e. lectures and review articles). Question formats could include multiple choice, true/false, and short answer (65 points possible)
Class Quiz (~11%)	Multiple choice, true/false, short answer quizzes will be assessed at the beginning of each Review session and will be based on content from previous lecture material and reading assignments. (65 points possible; 5 per quiz)

Lecture Attendance (~5%)	Students must be physically present for lecture. 85% attendance is require to pass the course (i.e. missing no more than 2 classes). Students are encouraged to ask questions and engage in discussion with classmates and instructors and ask questions during lecture and review sessions. In the case that no oral contributions are made during lecture, written questions or discussion points may be submitted after class and/or brought up during the review session. Participation will be graded on a 0-4 scale and follow defined criteria. (28 points possible, 2 per lecture)
Review Attendance (~5%)	All students will have the option of physical or remote attendance for the journal club reviews. Again, 85% is required to pass the course (i.e. missing no more than 2 classes). Students are expected to come prepared to critically discuss and ask questions about one of the scientific articles assigned for their literature synopses (26 points possible; 2 per session)

Spring 2024 Class Schedule

Date	Topic	Instructors	Reading	Homework	Quiz
Jan 8	Course Introduction and Expectations Cancer pathology, hallmarks, carcinogenesis, and genetics (GSBS Large Classroom)	Jian Hu, PhD Kanishka Sircar, MD Jason Huse, MD, PhD	Review 1	Literature Set A	
Jan 12	Review Session: Lecture 1 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 1
Jan 15	Martin Luther King Holiday (no class)				
Jan 22	Oncogenes and tumor viruses (GSBS Large Classroom)	Guocan Wang, PhD Lawrence Kwong, PhD	Review 2	Literature Set B Synopses A Due	
Jan 26	Review Session: Lecture 2 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 2
Jan 29	Tumor suppressor genes (GSBS Large Classroom)	George Calin, MD, PhD Sean Post, PhD	Review 3	Literature Set C Synopses B Due	

Feb 2	Review Session: Lecture 3 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 3
Feb 5	Regulation of the cell cycle and cell growth (GSBS Large Classroom)	Catherine Denicourt, PhD Walter Hittelman, PhD	Review 4	Literature Set D Synopses C Due	
Feb 9	Review Session: Lecture 4 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 4
Feb 12	Signal transduction programs and cancer metabolism (GSBS Large Classroom)	Jihye Yun, PhD Boyi Gan, PhD	Review 5	Literature Set E Synopses D Due	
Feb 16	Review Session: Lecture 5 (Comupter Lab)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 5
Feb 19	Genomic instability and DNA repair Apoptosis (p53), autophagy, and necrosis (GSBS Large Classroom)	Ferdinandos Skoulidis, MD, PhD Yang Liu, PhD (UT health)	Review 6	Literature Set F Synopses E Due	
Feb 23	Review Session: Lecture 6 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 6
Feb 26	Genomic instability and DNA repair (GSBS Large Classroom)	Katherina Schlacher, PhD John Tainer, PhD	Review 7	Literature Set G Synopses F Due	
Mar 1	Review Session: Lecture 7 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 7
Mar 4	Multi-step tumorigenesis (GSBS Large Classroom)	Nicholas Navin, PhD Andrea Viale, MD	Review 8	Literature Set H Synopses G Due	
Mar 8	Review Session: Lecture 8 (Comupter Lab)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 8
Mar 11	Cell immortalization and tumorigenesis Multi-step tumorigenesis (GSBS Large Classroom)	Ron DePinho, MD	Review 9	Literature Set I Synopses H Due	
Mar 15	Review Session: Lecture 9 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 9
Mar 18 - 22	Spring Break (no class)				
Mar 25	The cancer microenvironment – hypoxia, inflammation and stromal-	Raghu Kalluri, MD, PhD	Review 10	Literature Set J Synopses I	

	cancer interactions (GSBS Large Classroom)			Due	
March 29	Review Session: Lecture 10 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 10
Apr 1	Invasion, angiogenesis and metastasis (GSBS Large Classroom)	Joseph McCarty, PhD Dihua Yu, MD, PhD, MS	Review 11	Literature Set K Synopses J Due	
Apr 5	Review Session: Lecture 11 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 11
Apr 8	Tumor immunology and immunotherapy (GSBS Large Classroom)	Kristen Pauken, PhD James Allison, PhD	Review 12	Literature Set L Synopses K Due	
Apr 12	Review Session: Lecture 12 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 12
Apr 15	Cancer diagnostics – biomarkers (GSBS Large Classroom)	Johannes Fahrmann, PhD Ali Azhdarinia, PhD	Review 13	Literature Set M Synopses L Due	
Apr 19	Review Session: Lecture 13 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 13
Apr 22	Cancer therapies and predicting response (GSBS Large Classroom)	Robert Bast, BA, MD Timothy A. Yap, MBBS, PhD	Review 14	Synopses M Due	
Apr 26	Review Session: Lecture 14 (GSBS Large Classroom)	Jian Hu, PhD and Haoqiang Ying, PhD			Quiz 14
Apr 29	**End of Spring Semester**				
April 29-May3	Final Exams				