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

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 Fall 2021

Course Number and Course Title:
GS21 1351: Nano Course Cardio-oncology

Credit Hours: 1

Meeting Location: Virtual

Building/Room#: Virtual

WebEx/Zoom Link:
TBN

Program Required Course: ☐ Yes ☑ No

Approval Code: ☐ Yes ☑ No

(If yes, the Course Director or the Course Designee will provide the approval code.)

Audit Permitted: ☑ Yes ☐ No

Classes Begin: 9/10/2021

Classes End: 12/9/2021

Final Exam Week: 12/9/2021

Class Meeting Schedule

Day	Time
Attached	8:30AM-9:45AM

Course Director
Name and Degree: Jun-ichi Abe, MD, PhD

Title: Professor

Department: Cardiology

Institution: ☐ *UTH* ☑ *MDACC*

Email Address: jabe@mdanderson.org

Contact Number: 585-474-5456

Course Co-Director/s: (if any)

Name and Degree: Michael S. Ewer

Title: Professor

Department: Cardiology

Institution: ☐ *UTH* ☑ *MDACC*

Email Address: mewer@mdanderson.org

Contact Number:

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

Instructor/s (Use additional page as needed)

1. attached
   Name and Degree
   Institution:
   Email Address :
2. Name and Degree
   Institution:
   Email Address :
3. Name and Degree
   Institution:
   Email Address
4. Name and Degree
   Institution:
   Email Address

GS21 1351 Nano course in Cardio-oncology (2021)

Director: Drs. Jun-ichi Abe and Michael S. Ewer
Dates: September 10th – December 10th
Time: 8:30 am – 9:45 am (CST)
Place: Virtual
Class meets every Friday of the week.
For more information/questions: Dr. Jun-ichi Abe (585-474-5456);
jabe@mdanderson.org
Course materials will be available through Box, for access contact: Jun-ichi Abe

Synopsis: This course is designed to provide students with not only a comprehensive overview of the structure and function of the cardiovascular system (CVS) in both normal and pathological states, but also cancer and cancer treatment can affect CVS function. Disease processes affecting normal cardiovascular homeostasis will be discussed in the context of both human disease and experimental model systems. The course will introduce clinical/translational topics, signal transduction and current therapies of both the CVS and cancer, and potential avenues for novel cardiovascular research from the view of cardio-oncology. Lecturers include both clinical and basic scientists, providing a bench-to-bedside addition to the Ph.D. curriculum. There will be one 75-minute meetings per week, which will include lectures, paper discussions, case studies and lab studies. Evaluations will be based on a class participation, written review, and exam. The course is designed as an elective for students from numerous programs, and will ultimately be expanded into a two-semester course. There are no prerequisites for this course. Class size will be from 4-20 students, including a limited number of auditors. Auditors need to register for the course. Lectures are based on historical and recent literature. There is no required textbook, but can use "Cancer and the Heart" as the supplemental reading.

Learning Objectives

1. Understand the principles, challenges, approaches, and strategies of cardio-oncology research. Therefore, the trainees will be expected to attain the basic knowledge in terms of cancer treatment-associated CVD as well as both CVD and cancer treatments.
2. Understand the cardiac and vascular structure, and circulation system and function, and get the picture of the pathophysiology of common and major diseases of the cardiovascular system.
3. Grasp the molecular basis of cardiac contractility (e.g. E-C coupling, myosin-actin filaments) and electrophysiology (e.g. A-V conducting system and ion channels), and describe how abnormalities of these mechanisms produce important cardiovascular diseases, and understand the basics and molecular mechanisms of the process of vascular injury including atherosclerosis, aneurysm, restenosis, and hypertension.
4. Appreciate the importance of genetic factors in certain cardiovascular diseases and cancer treatment-associated CVD, and how to approach and analyze it.
5. Understand the current pharmacological strategy against CVD including ACEs, β-blockers, and PDE inhibitors in non-cancer patients.
6. Understand the current pharmacological strategy against oncogenesis, especially related to signal transduction and epigenetics including tyrosine kinase inhibitors (TKIs), DNA synthesis, histone de-acetylase (HDACs), and proteasome inhibitors.
7. Learn the incidents, pathogenesis, diagnosis, management, and prevention against cancer treatment associated CVD including heart failure, coronary and cerebral events, hypertension, thromboembolism, and arrhythmia.

8. Recognize the contribution of premature aging process in CVD, cancer, and cancer treatment-associated CVD, especially for long-term effects after therapy, and its molecular mechanisms.
9. Understand the contribution of cancer treatment in increasing risk factors of CVD such as hyper-cholesterolemia and obesity and its molecular mechanisms.
10. Obtain the ability to critically evaluate the literatures related cancer treatment-associated CVD.
11. Apprehend and be able to articulate the potential and future directions of cardio-oncology including targeting the down-stream or CVD specific events induced by cancer treatments, which will prevent CVD but will have no effect on the efficacy of cancer treatment. For example, topoisomerase-IIβ (top2β) is reported to be one of the direct target molecules of cardiotoxic drugs of the anthracycline family. Thus, depletion of top2β ameliorates anthracycline-mediated cardiotoxicity. Notably, since the heart only expresses top2β, new anthracycline that only poisons top2α, but not top2β, will be beneficial for healing cancer, but avoiding cardiomyopathy.

Sept.	10	Pathophysiology of CVD in cardio-oncology	Dr. Jun-ichi Abe
	17	Past, current, and future of Cardio-Oncology	Dr. Michael Ewer
Oct	1	TBN	Dr. Anita Deswal
	8	Anti-cancer drugs and cardio-oncology	Dr. Nicolas Palaskas
	15	Role of MRI in cardio-oncology	Dr. Juan Lopez-Mattei
	22	Radiation and CVD toxicity from the perspective of cardiologist	Dr. Syed Wamique Yusuf
	29	Cardiovascular health during cancer care	Dr. Elie Mouhayar
Nov	5	Cardiovascular toxicity in pediatric cancer patients	Dr. Eugenie Klieinerman
	12	Arrhythmias in cardio-oncology	Dr. Peter Kim
	19	Radiation Induced Heart Disease: Mechanism and Prevention	Dr. Steven H. Lin
Dec	3	Genetics and iPSC-cardiomyocytes: tools for understanding cardiotoxicity	Dr. Michelle Hildebrandt
	10	Exam	

Teaching Assistant: (if any) NA Name and Email Address Name and Email Address	**Cont. Instructor/s** 5. Name and Degree Institution: Email Address

Course description: This course is designed to provide students with not only a comprehensive overview of the structure and function of the cardiovascular system (CVS) in both normal and pathological states, but also cancer and cancer treatment, which affect CVS function.

Textbook/Supplemental Reading Materials (if any)

- Cancer and the Heart, Michael S. Ewer, 3rd Edition, People's Medical Publishing House
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Course Objective/s:

Upon successful completion of this course, students will

Apprehend and be able to articulate the potential and future directions of cardio-oncology including targeting the down-stream or CVD specific events induced by cancer treatments, which will prevent CVD but will have no effect on the efficacy of cancer treatment.

***Specific Learning Objectives*:**

1. Understand the principles, challenges, approaches, and strategies of cardio-oncology res
2. Learn the incidents, pathogenesis, diagnosis, management, and prevention against cance
3. Recognize the contribution of premature aging process in CVD, cancer, and cancer treatr
4. Obtain the ability to critically evaluate the literatures related cancer treatment-associated C
5.

Student responsibilities and expectations:

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

1. Prepare, check, and review (study) the course materials including slides for each lecture.
2. Write 1 one-page literature synopses or review summary from the assigned topics.
3. Participate in and contribute to course discussions during lecture, review sessions
4. Prepare for and take a final examination based on lecture and some reading materials.

Students are expected to check and review each lecture material (slides and papers) 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) ☐ Pass/Fail	
Student Assessment and Grading Criteria : (May include the following:)	
Homework (34 %)	Description Written review
Quiz (%)	Description
Presentation (%)	Description
Midterm Exams (%)	Description
Final Exam (33 %)	Description
Workshop or Breakout-Session (%)	Description
Participation and/or Attendance (33 %)	Description

CLASS SCHEDULE

Day/Date	Duration (Hr)	Lecture Topic	Lecturer/s
		Check the attached document	

NOTE: Provide other class information as needed.