

Course Syllabus – BIOL 420

Course Information

Course Number: BIOL 420 SP23

Course Name: Cancer Biology

Term: SP 2023

Start Date: 04/04/2023

End Date: 06/23/2023

Credits: 3.0

Meeting Days / Times

Tuesdays and Thursdays, 11:30am-1:00pm PT / 2:30-4:00pm ET
(See Calendar in Canvas for the most up-to-date schedule.)

Location

CA: Seminar Room (Hazen Theory Building)

FL: B214

Course Managers

Role	Last Name	First Name	Email Address
Course Director	Felding	Brunie	brunie@scripps.edu
Course Director	Janiszewska	Michalina	mjaniszewska@scripps.edu
TA	Bashian	Eleanor	ebashian@scripps.edu
TA	Onubogu	Ugoma	uonubogu@scripps.edu

Course Description

This course will provide an in-depth synopsis of the biology of cancer and is aimed at students on all tracks. The objective of the course is to introduce students to central concepts in cancer biology and genetics. The lectures will be organized into three broad themes:

- (1) Cancer cell intrinsic mechanisms (e.g., tumor suppressor/oncogene function; cell cycle regulation; altered signaling and transcriptional circuits; apoptosis; senescence; genome instability and the DNA damage/repair response; multistep tumorigenesis);
- (2) Non-tumor cell-autonomous mechanisms (e.g., tumor microenvironment; immune surveillance; inflammatory response; angiogenesis);
- (3) Cancer phenotypes and therapeutic approaches (tumor heterogeneity; screens for small

molecule inhibitors; efficacy studies; immunotherapy).

The students will be expected to participate in discussions of one or more key recent papers at a “journal club” that will be held at the end of each thematic group and submit a short written assignment related to the papers. There will also be a final exam covering the lecture material.

Program Learning Outcomes

By the end of the program, students will have accomplished these objectives:

PLO1: Original Research – graduate students are expected to develop the skills critical for generating high-quality research output. This would include absorbing, recalling, and contextualizing scientific knowledge, evaluating scientific information and data, creating testable hypotheses and investigating hypotheses, mastering scientific tools and techniques, displaying ethical behavior, and receiving and giving feedback.

PLO2: Communication – graduate students are expected to demonstrate the oral, written, and media skills to effectively communicate the impact of a study or a body of work to the greater scientific community and to the public at large using a number of methods.

PLO3: Critical Thinking – graduate students are expected to develop a self-directed process to analyze information, form opinions or judgments, and use this process to improve the quality of their scientific thoughts, navigate problems, and make informed decisions.

PLO4: Intellectual Curiosity – graduate students are expected to acquire the capacity to build their intellectual curiosity and demonstrate problem solving approaches that serve their professional growth and ability to impact a field.

PLO5: Career and Professional Development – graduate students are expected to develop a variety of transferable skillsets throughout their graduate experience, including management and leadership, inclusiveness, resilience, scientific rigor, collaboration, accountability, time management, teamwork, networking, and career planning.

Course Learning Outcomes

Upon completion of this course students will be able to:

CLO1: Understand the basic concepts and molecular mechanisms underlying malignancies.

CLO2: Understand the regulation and contribution of tumor cell intrinsic and non-autonomous functions in the pathogenesis of cancer.

CLO3: Have an understanding of cancer phenotypes, tumor heterogeneity, cell culture, and molecular techniques used in the study of the development, progression, maintenance, and treatment of cancer.

Background Preparation (Prerequisites)

Satisfactory completion of an undergraduate course in molecular biology is required; knowledge of the principles of genetics will be helpful, but not required.

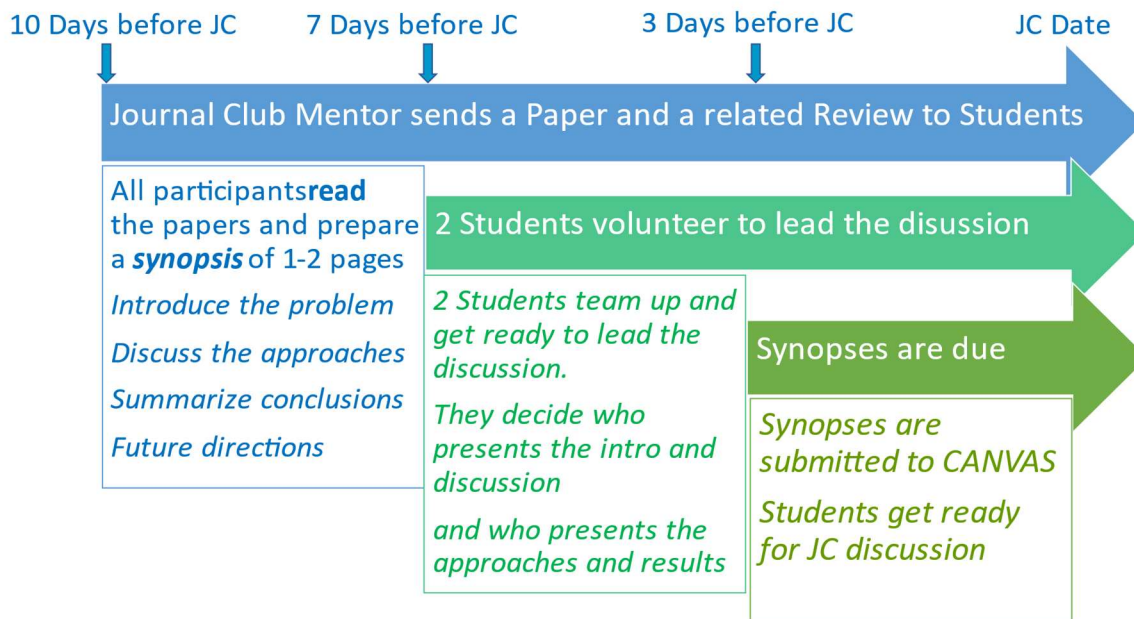
Course Materials

Required: Weinberg, R.A. (2013). The Biology of Cancer (2nd Edition). ISBN: 978-0815342205.

Access to the textbook's student site and animations/videos:

<https://digital.wwnorton.com/cancer2>

Journal Club Format



JC	Faculty Mentor	Mentor sends Papers on	2 Students volunteer to lead the discussion	Synopses are due	Journal Club Date
1	Mia Huang	May 6	May 9	May 13	Tue May 16
2	Peng Wu	May 27	May 30	Jun 3	Tue Jun 6
3	Silke Paust	May 29	Jun 1	Jun 5	Thu Jun 8

Mentor Contacts: **Dr. Mia Huang** (Molecular Medicine, CA) miahuang@scripps.edu
Dr. Peng Wu (Molecular Medicine, CA) pengwu@scripps.edu
Dr. Silke Paust (Immunology, CA) paust@scripps.edu

TA Contacts: Elenanor Bashian (Molecular Medicine, CA) ebashian@scripps.edu
 Ugoma Onubogu (Biomedical Research, FL) uonubogu@scripps.edu

Attendance Statement

Students are expected to attend all classes. Students who are unable to attend class must seek permission for an excused absence from the course director or lecturer. Unapproved absences or late attendance for three or more classes may result in a lower grade or an “incomplete” for the course. If a student has to miss a class, he or she should arrange to get notes from a fellow student and is strongly encouraged to meet with the lecturer to obtain the missed material. Missed extra-credit quizzes will not be available for re-taking.

Scientific and Professional Ethics

The work you do in this course must be your own. Feel free to build on, react to, criticize, and analyze the ideas of others but, when you do, make it known whose ideas you are working with. You must explicitly acknowledge when your work builds on someone else's ideas, including ideas of classmates, professors, and authors you read. If you ever have questions about drawing the line between others' work and your own, ask the course director or lecturer who will give you clear guidance. Exams must be completed independently. Any collaboration on answers to exams, unless expressly permitted, may result in an automatic failing grade and possible expulsion from the Graduate Program.

Technology Requirements and Support

For issues related to Canvas, please contact the Graduate Office by email at: gradprgm@scripps.edu or by phone at: 858-784-8469.

Course Grading

Grading is in accordance with the academic policies of the Skaggs Graduate School. The breakdown of grading is as follows:

Journal Club Discussions/Papers 45%

Classroom Participation 10%

Final Exam 45%

Letter Grade	Percent	GPA	Description
A	93-100	4.00	Outstanding achievement. Student performance demonstrates full command of the course subject matter and evinces a high level of originality and/or creativity that far surpasses course expectations.
A-	90-92	3.67	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.

B+	87-89	3.33	Very good work. Student performance demonstrates above-average comprehension of the course subject matter and exceeds course expectations on all tasks as defined in the course syllabus. There is notable insight and originality.
B	83-86	3.00	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.
B-	80-82	2.67	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.
C+	77-79	2.33	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.
C	73-76	2.00	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.
P	73-100	0.00	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.
F	0-72	0.00	Unacceptable work/Failure. Student performance is unacceptably low level of knowledge and understanding of course subject matter. Course will not count toward degree. Student may continue in program only with permission of the Dean.
I		0.00	Incomplete is assigned when work is of passing quality but is incomplete for a pre-approved reason. Once an incomplete grade is assigned, it remains on student's permanent record until a grade is awarded.
W		0.00	Withdrew from the course with Dean's permission beyond the second week of the term.

- All courses will be recorded and maintained in the student's permanent academic record; only courses that apply towards the degree will appear on the academic transcript. Non-credit or audited courses will not appear on the transcript.
- 4 core courses taken for a letter grade (pass = B- or higher for a core course)

2 elective courses taken pass/fail (pass = A, B, C for an elective)

Course Summary:

Date	Details
Tue Apr 4, 2023	Chapters 1, 2, and 4: The Biology and Genetics of Cancer and Cellular Oncogenes (Felding)
Thu Apr 6, 2023	Chapters 5 and 6: Growth Factors, Receptors, and Cancer / Cytoplasmic Signaling Circuitry Programs Many of the Traits of Cancer (Felding)
Tue Apr 11, 2023	Chapter 12: Maintenance of Genomic Integrity and the Development of Cancer (Xiaohua Wu)
Thu Apr 13, 2023	Cancer Genomics and Precision Medicine (Pipkin)
Tue Apr 18, 2023	Chromatin Dependent Transcriptional Signaling in Cancer (Erb)
Thu Apr 20, 2023	Chapter 10 - Eternal Life: Cell Immortalization and Tumorigenesis (Janiszewska)
Tue Apr 25, 2023	Cancer Cell Metabolism (Felding)
Thu Apr 27, 2023	Chapters 9 and 11: p53 and Apoptosis: Master Guardian and Executioner / Multi-Step Tumorigenesis (Yang)
Tue May 2, 2023	Chapters 15 and 16: Crowd Control: Tumor Immunology and Immunotherapy / The Rational Treatment of Cancer (Teijaro)
Thu May 4, 2023	Translation (Karbstein)
Tue May 9, 2023	Chapter 14: Moving Out: Invasion and Metastasis (Felding)
Thu May 11, 2023	Circadian Disruption and Cancer Risk (Lamia)
Tue May 16, 2023	Journal Club 1 (Huang)
Thu May 18, 2023	Chapters 7 and 8 - Tumor suppressor genes / pRb and Control of the Cell Cycle Clock (Page)
Tue May 23, 2023	C.A.R.L.O.S. (Donald Siegel, UPenn)
Thu May 25, 2023	Chapter 16: The Rational Treatment of Cancer (Lairson)
Tue May 30, 2023	Tumor Heterogeneity (Janiszewska)
Thu Jun 1, 2023	Chapter 16 - The Rational Treatment of Cancer (Lairson)
Tue Jun 6, 2023	Journal Club 2 (Wu)
Thu Jun 8, 2023	Journal Club 3 (Paust)
Tue Jun 13, 2023	Review Session
Thu Jun 15, 2023	Final Exam
	Roll Call Attendance