

Course Syllabus – BIOL 420

Course Information

Course Number: BIOL 420 SP25
Course Name: Cancer Biology
Term: SP 2025
Start Date: 04/08/2025
End Date: 06/27/2025
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: Graduate Office Dining Room (Hazen Theory Building)
FL: C204

Course Managers

Role	Last Name	First Name	Email Address
Course Director	Janiszewska	Michalina	mjaniszewska@scripps.edu
Course Coordinator (CA)	Felding	Brunie	brunie@scripps.edu
TA	Thomas	Benjie	benthomas@scripps.edu
TA	Wolfe	Kelsey	kwolfe@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)

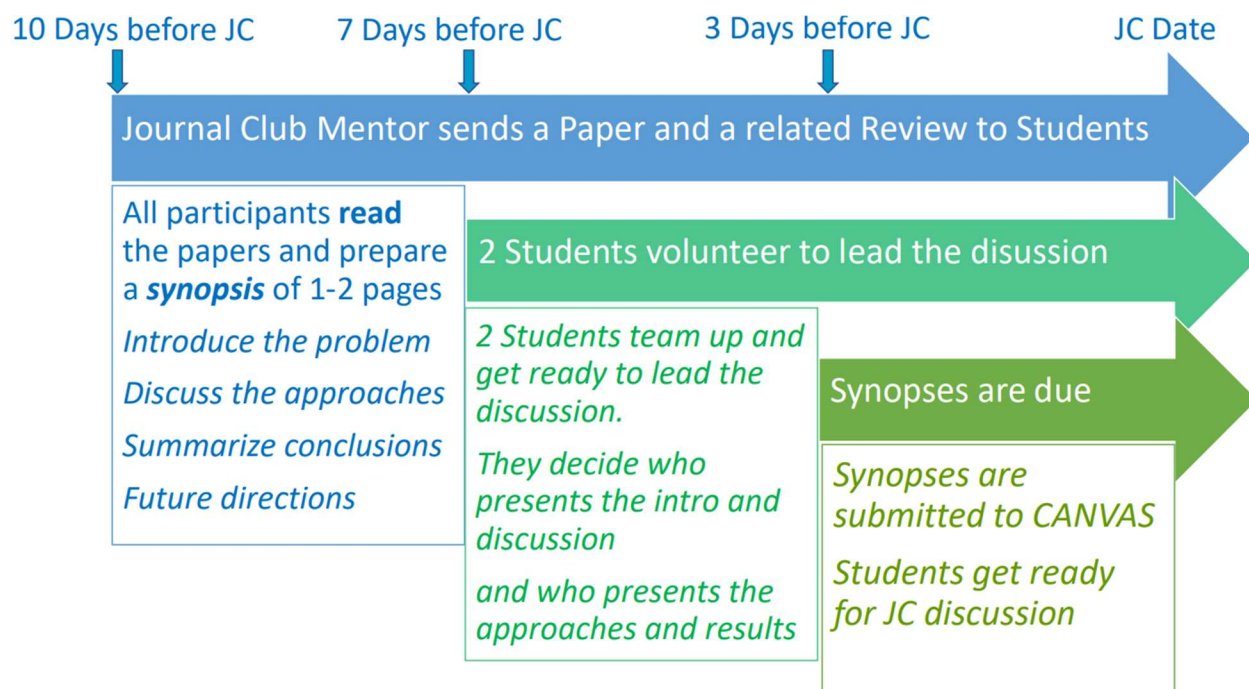
Satisfactory completion of an undergraduate course in molecular biology is required; knowledge of the principles of genetics will be helpful, but not required.

Course Materials

Required: Weinberg, R.A. (2023). The Biology of Cancer (3rd Edition). ISBN: 978-0393887655

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	Ciaran Seath	2-May	6-May	10-May	Tuesday May 13
2	Mia Huang	26-May	29-May	2-Jun	Thursday June 5
3	Peng Wu	30-May	3-Jun	7-Jun	Tuesday June 10
Mentor Contact:					
	Ciaran Seath (FL)	cseath@scripps.edu			
	Mia Huang (CA)	miahuang@scripps.edu			
	Peng Wu (CA)	pengwu@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 40%

Classroom Participation 15%

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 8, 2025	Event Chapters 1, 2, and 4: The Biology and Genetics of Cancer and Cellular Oncogenes (Felding)
Thu Apr 10, 2025	Event Chapters 7 and 8 - Tumor suppressor genes / pRb and Control of the Cell Cycle Clock (Janiszewska)
Tue Apr 15, 2025	Event Chapters 5 and 6 - Growth Factors, Receptors, and Cancer / Cytoplasmic Signaling Circuitry Programs Many of the Traits of Cancer (Felding)
Thu Apr 17, 2025	Event Cancer Genomics and Precision Medicine (Pipkin)
Tue Apr 22, 2025	Event Chromatin Dependent Transcriptional Signaling in Cancer (Erb)
Thu Apr 24, 2025	Event Chapter 10 - Eternal Life: Cell Immortalization and Tumorigenesis (Janiszewska)
Tue Apr 29, 2025	Event Chapter 12 - Maintenance of Genomic Integrity and the Development of Cancer (Janiszewska)
Thu May 1, 2025	Event Chapters 9 and 11: p53 and Apoptosis: Master Guardian and Executioner / Multi-Step Tumorigenesis (Yang)
Tue May 6, 2025	Event Cancer Cell Metabolism (Felding)
Thu May 8, 2025	Event Chapter 14: Moving out: Invasion and Metastasis (Felding)
Sat May 10, 2025	Journal Club 1 Synopsis
Tue May 13, 2025	Event Journal Club 1 (Seath)
Thu May 15, 2025	Event Chapters 15 and 16: Crowd control: Tumor immunology and Immunotherapy (Teijaro)
Fri May 16, 2025	Event Commencement (No Class)

Tue May 20, 2025	Event Translation in cancer (Hacisuleyman)
Thu May 22, 2025	Event Circadian disruption and cancer risk (Lamia)
Mon May 26, 2025	Event No Class (Memorial Day)
Tue May 27, 2025	Event Clinical Advances in Precision Oncology (Felding)
Thu May 29, 2025	Event Ferroptosis in cancer (Zhang)
Mon Jun 2, 2025	Journal Club 2 Synopsis
Tue Jun 3, 2025	Event Tumor Heterogeneity (Janiszewska)
Thu Jun 5, 2025	Event Journal Club 2 (Huang)
Sat Jun 7, 2025	Journal Club 3 Synopsis
Tue Jun 10, 2025	Event Journal Club 3 (Wu)
Thu Jun 12, 2025	Event Chapter 16: The rational Treatment of Cancer (Lairson)
Tue Jun 17, 2025	Event Review Session
Thu Jun 19, 2025	Event No Class (Juneteenth)
Tue Jun 24, 2025	Final Exam