

Course Syllabus – BIOL 420

Course Information

Course Number: BIOL 420 SP19

Course Name: Cancer Biology

Term: SP 2019

Start Date: 03/26/2019

End Date: 06/14/2019

Credits: 3.0

Meeting Days / Times

Tuesdays and Thursdays, 11:30am-1:00pm PST / 2:30-4:00pm EST

(See Calendar in Canvas for the most up-to-date schedule.)

Locations

CA Campus: Graduate Office (Hazen Theory Building) Seminar Room

FL Campus: B214

Course Managers

Role	Last Name	First Name	Email Address
Instructor	Felding	Brunie	brunie@scripps.edu
Instructor	Kissil	Joseph	jkissil@scripps.edu
Instructor	Rader	Christoph	crader@scripps.edu
TA	Goydel	Rebecca	rgoydel@scripps.edu
TA	Shirey	Ryan	rshirey@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: Published research story.

PLO2: Generate creative approaches and methodologies for complex scientific questions.

PLO3: Master a potent set of technical research skills.

PLO4: Possess strong communication skills.

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>

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%

Grade Point	Letter Grade	
4.00	A	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.
3.67	A-	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.
3.33	B+	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.
3.00	B	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.
2.67	B-	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.

2.33	C+	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.
2.00	C	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.
0.00	I	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.
0.00	P	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.
0.00	F	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.
0.00	W	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)

Because students are encouraged to take electives outside their area of expertise, a "C" letter grade is passing.

Course Summary:

Date	Details
Tue Mar 26, 2019	Chapters 1, 2, and 4 - The Biology and Genetics of Cancer and Cellular Oncogenes (Brunie Felding)
Thu Mar 28, 2019	Chapters 5 and 6 - Growth Factors, Receptors, and Cancer / Cytoplasmic Signaling Circuitry Programs Many of the Traits of Cancer (Brunie Felding)
Tue Apr 2, 2019	Chapter 12 - Maintenance of Genomic Integrity and the Development of Cancer (Steven Reed)
Thu Apr 4, 2019	Chapter 3 - Tumor Viruses (Peter Vogt)
Tue Apr 9, 2019	Transcription (Matthew Pipkin)
Thu Apr 11, 2019	Chapters 7 and 8 - Tumor Suppressor Genes / pRb and Control of the Cell Cycle Clock (Curt Wittenberg)
	Luncheon
Tue Apr 16, 2019	Translation (Katrin Karbstein)
Thu Apr 18, 2019	Chapters 9 and 11 - p53 and Apoptosis: Master Guardian and Executioner / Multi-Step Tumorigenesis (Joe Kissil)
Mon Apr 22, 2019	Journal Club 1 (Christoph Rader)
Tue Apr 23, 2019	Journal Club 1 (Christoph Rader)
Thu Apr 25, 2019	Cancer Cell Metabolism (Brunie Felding)
Tue Apr 30, 2019	Chapter 14 - Moving Out: Invasion and Metastasis (Brunie Felding)
Thu May 2, 2019	Circadian Disruption & Cancer Risk (Katja Lamia)
Tue May 7, 2019	Chapter 10 - Eternal Life: Cell Immortalization and Tumorigenesis (Michalina Janiszewska)
Wed May 8, 2019	Journal Club 2 (Christoph Rader)
Thu May 9, 2019	Journal Club 2 (Rader)
Tue May 14, 2019	C.A.R.L.O.S. (Donald Siegel, UPenn)
Thu May 16, 2019	Chapters 15 and 16 - Crowd Control: Tumor Immunology and Immunotherapy / The Rational Treatment of Cancer (Christoph Rader)
Tue May 21, 2019	Tumor Heterogeneity (Michalina Janiszewska)
Thu May 23, 2019	Chapter 16 - The Rational Treatment of Cancer (Luke Lairson)
Mon May 27, 2019	Journal Club 3 (Peng Wu)
Tue May 28, 2019	Journal Club 3 (Peng Wu)
Thu May 30, 2019	Chapter 16 - The Rational Treatment of Cancer (Luke Lairson)
Tue Jun 4, 2019	Final Exam