

Course Syllabus

[Jump to Today](#)

 [Edit](#)



Chaminade
University
OF HONOLULU

Course Title: Systems Biology

Course Number: BI-420

Course credits: 3

Term: Fall 2023

Meeting Days: Friday

Meeting Hours: 2:30 - 5:20pm

Meeting Location: Room 102 Henry Hall, [link to campus map](https://chaminade.edu/student-success/nso/nso-campus-map/)  (<https://chaminade.edu/student-success/nso/nso-campus-map/>)

Instructor: Michael Dohm, PhD

Department: Biology, School of Natural Sciences and Mathematics

Office: Wesselkamper Science Center (WSC) rm. 108

Phone: (808) 739 -- 8543

Office Hours: 9 - 11 am on Wednesday & Friday or by appointment

E-mail: mdohm [at] chaminade.edu (current students, please use CANVAS messaging)

Website: letgen.org (<https://letgen.org/>)

Course Overview

BI-420 Systems Biology is a one semester introduction help students connect mathematical concepts to biological real- world problems. Through hands-on exercises, discussion, and in-class projects, we will learn how mathematical models of biological networks are built and how the analysis of such models help to understand the system-level properties of networks.

CANVAS

BI420 is a web-enhanced course, i.e., instruction takes place in the classroom, and technology, including the website, are used to complement and support face-to-face instruction. All lecture media, course handouts, including the syllabus, will be made available through our web site.

Link: <https://chaminade.instructure.com/courses/28928/>

University Course Catalog Description

This course will focus on the frontiers of our understanding of the multi-level networks that underlie biological systems. Lecture course reviewing the key concepts of the systems biology approach to ecological, organismal and cellular systems. Contribution of cornerstone technologies such as genomics, bioinformatics, proteomics and metabolomics will be reviewed, along with their computational foundations.

Course Prerequisites

BC 308 or BI 308 and BC 308L or BI 308L , BI 311 (recommended)

Required Learning Materials

Required textbook. *A First Course in Systems Biology, second edition*, by Eberhard Volt. ISBN: 978-0815345688. The text book is available in paperback or as eBook. Make sure to get an official copy, preferably through the [Chaminade University Bookstore](https://chaminade.bncollege.com/shop/chaminade/page/find-textbooks) (<https://chaminade.bncollege.com/shop/chaminade/page/find-textbooks>).

Required software. R statistical software (free); RStudio (free), Cytoscape (free), Office suite software (presentation, spreadsheet, word processing) Google, Microsoft or LibreOffice

Finding *additional* resources in addition to the required textbook is encouraged. Reading from a diversity of voices about a subject will benefit student learning. Recommended, but not required alternative textbooks include

Technical Assistance for Canvas Users:

The BI420 website is supported by the Canvas course management platform. CANVAS is the CMS adopted by Chaminade University. Assistance with CANVAS

- Search ([Google \(https://chaminade.instructure.com/courses/28868/assignments/google.com\)](https://chaminade.instructure.com/courses/28868/assignments/google.com)), Bing, etc.) for help on specific topics or get tips in Canvas Students.
- Live chat with Canvas Support for students
- Canvas Support Hotline for students: +1-833-209-6111
- Watch this video to get you started
- Online tutorials: click on “Students” role to access tutorials
- Contact the Chaminade IT Helpdesk for technical issues: helpdesk@chaminade.edu or call (808) 735-4855

Course Credit Hour Expectations

BI420 is a three-credit hour course and therefore requires a minimum of 135 hours of student engagement (see CUH Credit Hour Policy). One university semester credit hour typically includes one hour of contact time with the instructor plus two hours of preparation time by the student. Thus, over the course of the semester, students enrolled in BI420 are expected to spend about 40 hours in class, 20 hours on **quizzes** (reading, problem solving), 35 hours on **homework** (coding, reading, problem solving), and up to 40 hours preparing for the **project**.

Assessment

Quizzes are multiple-choice or one word-answer format and will be taken online via the Canvas. Quizzes are scheduled outside of scheduled class time. Quizzes will be available for a minimum of 24-48 hours to access and complete the assignment. However, once you start, you are permitted 50 minutes to complete and submit the quiz. You have the right to take any or all quizzes by paper; you would then take the quiz as part of an arranged proctored session outside of regular class hours but before the due date for the quiz. The advantage of taking the quizzes online is that it permits rapid grading and immediate feedback – because the quizzes are predominately multiple choice, you will receive immediate feed-back once the quiz closes. The quizzes are open-book, open-notes; however, you are strongly encouraged to avoid the temptation to complete the quizzes simply by looking through your text and notes for answers. First, you will likely run out of time. Second, the quizzes are intended to demonstrate your current understanding of the material. There are a total of eleven (11) quizzes; lowest score may be dropped.

Homework is a required element for BI420. Homework and quizzes are delivered via CANVAS. Homework is assigned for each chapter. Due dates for assignments are reported as month/day (mm/dd). In general, assignments are due by 11:59am HST on the date due. Details about each graded element are discussed in class with materials posted in Canvas. There are a total of eleven (11) homework assignments; lowest score may be dropped.

Project. Completion of an individual project is required. Students select a systems problem, research the topic, develop and test a model, provide an executive summary supported by appendices, and produce a 10 min video about the project.

Participation: A total of 80 points are possible for participation and regular attendance. Students with regular attendance, defined as no more than four, nonconsecutive, unexcused absences during the semester, will be awarded 6 points – all others will receive zero points. Attendance is important, but active, meaningful participation during class will also be evaluated. You will be expected to facilitate classroom and forum exam discussions by asking questions; you are also expected to respond to forum postings and contribute to classroom discussions.

Grades

Points available and weights for each graded element are listed in the table.

Item	How many?	Points per item	Points	Weight
Quizzes (drop lowest score)	11	6	60	12%
Homework (drop lowest score)	11	6	60	12%
Project	1	300	300	60%
Participation	weekly	5	80	16%
			500	100%

Official grade records

Canvas provides a way for you to monitor your graded assignments. This is convenient, but students should be aware that the final word about grades depends on the Official Grade Book for the course. Thus, although the Canvas record will show your points for an assignment, be advised that your assigned grade is finalized by the official grade book, which is maintained by Dr Dohm. You may always inquire about your current standing in the course by sending a message to Dr Dohm from within Canvas.

Grading Scale

Letter grades are given in all courses except those conducted on a credit/no credit basis. They are interpreted as follows:

A	≥ 90%	Outstanding scholarship and an unusual degree of intellectual initiative
B	≥ 80 - 89%	Superior work done in a consistent and intellectual manner
C	≥ 70 - 79%	Average grade indicating a competent grasp of subject matter
D	≥ 50 - 69%	Inferior work of the lowest passing grade, not satisfactory for fulfillment of prerequisite course work.
F	< 50%	Failed to grasp the minimum subject matter; no credit given

Course Schedule

The schedule is tentative and subject to change by the instructor.

Due dates for assignments are reported as month/day (mm/dd). In general, assignments are due by 11:59pm HST on the date due. All pages refer to *A First Course in Systems Biology, second edition*

[Click here to view the Lecture and Assignments schedule for BI-420.](#)

Student (Course) Learning Outcomes

At the conclusion of BI-420, students will:

1. Define the terms 'system biology' and explain how the era of 'big data' has developed from the molecular biology and computational revolution of the last decade.
2. Explain the techniques that generate "omic" data sets, specifically genomes, transcriptomes, epigenomes, microbiomes, metabolomes and proteomes.
3. Manipulate (retrieve, reformat, merge) and derive insights from (interpret) data sets that exemplify these "omes".
4. Apply sophisticated data visualization tools to extract meaning from a massive data set.
5. Relate systems approaches to a contemporary problem in medical, or environmental biology
6. Work as part of a team to solve complex problems and to present results by writing and producing a short video.

Alignment of Course Learning Outcomes (CLO) to Biology Program Outcomes (PLO)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1				X		X
CLO2		X				X
CLO3		X		X		X
CLO4		X		X	X	X
CLO5				X		X

Biology Program Learning Outcomes (PLO)

Upon completion the program in Biology, a graduating student will demonstrate the following competencies:

1. Apply the scientific method in the design and testing of hypotheses
2. Transform and display, statistically evaluate, validate, and interpret scientific data and communicate the results of such analyses effectively both orally and in writing
3. Acquire, summarize, and synthesize information from published scientific literature, databases and bioinformatics software to extract and interpret biological data
4. Recognize the chemical and physical principles that underlie all life forms, and the biological organization at the molecular, cellular, tissue, organ, organism, and system levels that emerge from these principles

5. Define the components and processes of genetic and epigenetic information transmission, and their determinant effects on the adaptive and evolutionary processes that they drive
6. Integrate an awareness of bioethical issues to positively influence the application of science to service, justice and peace in the solution of societal problems

University outcomes

Marianist Values

This class represents one component of your education at Chaminade University of Honolulu. An education in the Marianist Tradition is marked by five principles and you should take every opportunity possible to reflect upon the role of these characteristics in your education and development:

1. Education for formation in faith
2. Provide an integral, quality education
3. Educate in family spirit
4. Educate for service, justice and peace
5. Educate for adaptation and change

Native Hawaiian Values

Education is an integral value in both Marianist and Native Hawaiian culture. Both recognize the transformative effect of a well-rounded, value-centered education on society, particularly in seeking justice for the marginalized, the forgotten, and the oppressed, always with an eye toward God (Ke Akua). This is reflected in the 'Olelo No'eau (Hawaiian proverbs) and Marianist core beliefs:

1. Educate for Formation in Faith (Mana) E ola au i ke akua ('Olelo No'eau 364) May I live by God
2. Provide an Integral, Quality Education (Na'auao) Lawe i ka ma'alea a kū'ono'ono ('Olelo No'eau 1957) Acquire skill and make it deep
3. Educate in Family Spirit ('Ohana) 'Ike aku, 'ike mai, kōkua aku kōkua mai; pela iho la ka nohana 'ohana ('Olelo No'eau 1200) Recognize others, be recognized, help others, be helped; such is a family relationship
4. Educate for Service, Justice and Peace (Aloha) Ka lama kū o ka no'eau ('Olelo No'eau 1430) Education is the standing torch of wisdom
5. Educate for Adaptation and Change (Aina) 'A'ohe pau ka 'ike i ka hālau ho'okahi ('Olelo No'eau 203) All knowledge is not taught in the same school

Alignment of Natural Sciences Courses with Marianist and Hawaiian values of the University.

The Natural Sciences Division provides an integral, quality education: sophisticated integrative course content taught by experienced, dedicated, and well-educated instructors.

- We educate in the family spirit – every classroom is an Ohana and you can expect to be respected yet challenged in an environment that is supportive, inclusively by instructors who take the time to

personally get to know and care for you.

- We educate for service, justice and peace, since many of the most pressing global issues (climate change, health inequity, poverty, justice) are those which science and technology investigate, establish ethical parameters for, and offer solutions to.
- We educate for adaptation and change. In science and technology, the only constant is change. Data, techniques, technologies, questions, interpretations and ethical landscapes are constantly evolving, and we teach students to thrive on this dynamic uncertainty.

The study of science and technology can be formative, exploring human creativity and potential in the development of technologies and scientific solutions, the opportunity to engage in the stewardship of the natural world, and the opportunity to promote social justice. We provide opportunities to engage with the problems that face Hawai'i and the Pacific region through the Natural Sciences curriculum, in particular, those centered around severe challenges in health, poverty, environmental resilience, and erosion of traditional culture. The Marianist Educational Values relate to Native Hawaiian ideas of mana, na'auao, ohana, aloha and aina. We intend for our Natural Sciences programs to be culturally-sustaining, rooted in our Hawaiian place, and centered on core values of Maiau, be neat, prepared, careful in all we do; Makawalu, demonstrate foresight and planning; `Ai, sustain mind and body; Pa`a Na`au, learn deeply.

Course policies

Canvas "grading"

Canvas "grades" are tentative and not official. Canvas scores available to students are not official until the instructor announces such to the class. Official grading is done by the instructor and records are kept on the instructor's computer.

Instructor and Student Communication

Questions for this course can be posted to the instructor via CANVAS. Online, in-person and phone conferences can be arranged. Most messages to Canvas will be replied within 24 hours, often much sooner. Email to instructor's chaminade.edu e-mail may take up to 3 days for response.

Graded materials will be returned within 7 - 10 days.

Accessibility and Accommodations

If you need individual accommodations to meet course outcomes because of a documented disability, please speak with me to discuss your needs as soon as possible so that we can ensure your full participation in class and fair assessment of your work. Students with special needs who meet criteria for the Americans with Disabilities Act (ADA) provisions must provide written documentation of the need for accommodations from the Counseling Center by the end of week three of the class, in order for instructors to plan accordingly. If a student would like to determine if they meet the criteria for

accommodations, they should contact the Counseling Center at (808) 735-4845 for further information (counselingcenter@chaminade.edu).

Title IX Compliance

Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. If you or someone you know has been harassed or assaulted, you can find the appropriate resources by visiting Campus Ministry, the Dean of Students Office, the Counseling Center, or the Office for Compliance and Personnel Services.

Attendance & Tardiness

Students are expected to attend regularly all courses for which they are registered. Students should notify their instructors when illness or other extenuating circumstances prevents them from attending class and should make arrangements to complete their missed assignments. Notification may be done by emailing the instructor's Chaminade email address, calling the instructor's campus extension or by leaving a message with the instructor's division office (Natural Science and Mathematics - 1 (808) 440-4204). It is the instructor's prerogative to modify deadlines of course requirements accordingly.

Chaminade administrative withdrawal policy. If you miss two consecutive classes in an unexcused fashion (i.e. with prior email approval from me) then you will be withdrawn from the class.

Additional attendance and participation requirements. No more than six classes may be missed across the whole semester. Failure to score at least 50 points (80 possible) on attendance will result in failure of the course.

Consecutive unexcused absences equivalent to more than one week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being withdrawn from the course by the instructor, although the instructor is not required to withdraw students in that scenario. Repeated absences put students at risk of failing grades.

Reasons for tardiness should be explained to the instructor at the end of the class. Repeated tardiness may lead to a grade reduction for the course. Repeated unexcused tardiness may result in discussion with the instructor regarding the ability of the student to commit to the class.

Policy on Make-Up Tests

Makeup exams and quizzes are not given unless a student is ill and contacts the instructor within 24 hours of missed class period. A doctor's written excuse should be supplied at the NEXT class attended. Extra credit opportunities may be available during the course of regular lectures or may be written into the exams.

Incomplete

Students and instructors may negotiate an incomplete grade when there are specific justifying circumstances. An Incomplete Contract (available from the Divisional Secretary and the Portal) must be completed. When submitting a grade, the “I” will be accompanied by the alternative grade that will automatically be assigned after 90 days. These include IB, IC, ID, and IF. If only an “I” is submitted the default grade is F. The completion of the work, evaluation, and reporting of the final grade is due within 90 days after the end of the semester or term. This limit may not be extended.

Writing Policy

Instructions for the writing assignments are detailed for each individual assignment on the canvas course page.

Potential resources for writing assignments:

- Slickwrite
- Google Scholar
- PubMed
- Sullivan Library

Cell phones, tablets, and laptops

Instructor policy: Students are encouraged to use personal digital devices during class provided such use does not distract others or interfere with class activities.

University policy: Music Devices and Cellular Phones: *Unless specifically permitted by your instructor* [emphasis by instructor], use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes, as it is discourteous and may lead to suspicion of academic misconduct. Students unable to comply will be asked to leave class. Out of consideration for your classmates, please set your cell phone to silent mode during class. Students are encouraged to bring laptops or tablets to class as the instructor will assign online activities and readings that will require the use of a laptop or tablet. Laptops and tablets should not be misused, such as checking distracting websites. Use your best judgment and respect your classmates and instructor.

Recording of lecture material

Students may not record audio or video of lectures conducted by the instructor nor of any media presented during the lecture without prior permission from the instructor. All materials presented in class by the instructor will be made available to students.

Academic Conduct Policy

The success of the Honor Code is made possible only with the acceptance and cooperation of every student. Each student is expected to maintain the principles of the Code. Example of Honor Code violations include, but are not limited to:

- Giving or receiving information from another student during an examination;
- Using unauthorized sources for answers during an examination;
- Illegally obtained test questions before the test;
- Any and all forms of plagiarism – submit all or part of someone else’s work or ideas as your own;
- The destruction and/or confiscation of school and/or personal property.

Violations of Academic Integrity: Violations of the principle include, but are not limited to:

- Cheating: Intentionally using or attempting to use unauthorized materials, information, notes, study aids, or other devices in an academic exercise.
- Fabrication and Falsification: Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of inventing or counterfeiting information for use in any academic exercise.
- Multiple Submissions: The submission of substantial portions of the same academic work for credit (including oral reports) more than once without authorization.
- Plagiarism: Intentionally or knowingly presenting the work of another as one’s own (i.e., without proper acknowledgment of the source).
- Abuse of Academic Materials: Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource materials.
- Complicity in Academic Dishonesty: Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

Plagiarism includes, but is not limited to:

- Complete or partial copying directly from a published or unpublished source without proper acknowledgement to the author. Minor changes in wording or syntax are not sufficient to avoid charges of plagiarism. Proper acknowledgement of the source of a text is always mandatory.
- Paraphrasing the work of another without proper author acknowledgement.
- Submitting as one’s own original work, however freely given or purchased, the original exam, research paper, manuscript, report, computer file, or other assignment that has been prepared by another individual.

Consequences of academic honesty violations:

From the [Chaminade University catalog](#)

(<https://catalog.chaminade.edu/generalinformation/academicaffairs/policies/academichonesty>): Academic honesty is an essential aspect of all learning, scholarship, and research. It is one of the values regarded most highly by academic communities throughout the world. Violations of the principle of academic honesty are extremely serious and will not be tolerated. Students are responsible for promoting academic honesty at Chaminade by not participating in any act of dishonesty and by reporting any incidence of academic dishonesty to an instructor or to a University official. Academic dishonesty may include theft of records or examinations, alteration of grades, and plagiarism, in addition to more obvious dishonesty. Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Dean of the Academic Division. Punishment for academic dishonesty will be determined by the instructor and the Dean of Academic Division and may

include an “F” grade for the work in question, an “F” grade for the course, suspension, or dismissal from the University.

Additional information on student conduct can be found in the student handbook.

Tutoring and Writing Services



Chaminade is proud to offer free, one-on-one tutoring and writing assistance to all students. Tutoring and writing help is available on campus at Kōkua ‘Ike: Center for Student Learning in a variety of subjects (including, but are not limited to: biology, chemistry, math, nursing, English, etc.) from trained Peer and Professional Tutors. Please check Kōkua ‘Ike’s website (<https://chaminade.edu/advising/kokua-ike/>) for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via Smarthinking. Smarthinking can be accessed 24/7 from your Canvas account. Simply click Account – Notifications – Smarthinking. For more information, please contact Kōkua ‘Ike at tutoring@chaminade.edu or 808-739-8305.

Online Tutoring through Smarthinking

- All CUH students are eligible to use Smarthinking, an online tutoring system. Students can access Smarthinking via their Canvas account.
- Through Smarthinking, students can connect in real-time with an expert educator in a variety of subjects using a virtual whiteboard technology. Students also have an option to schedule a 30-minute appointment with a tutor of their choice. The Online Writing Lab provides students with the ability to receive a detailed, personalized critique of any written assignment through a formal critique process.
- All sessions are archived and available for students to review at any time for studying or test preparation.

Note: Due dates for assignments are subject to change.

Course Summary:

Date	Details	Due
Fri Sep 1, 2023	 First system (https://chaminade.instructure.com/courses/28928/assignments/305304)	due by 2pm
Thu Sep 7, 2023	 First system, now in R (https://chaminade.instructure.com/courses/28928/assignments/306339)	due by 2pm