

Course Syllabus

Course Number: BI 104-02

Course Title: Digital Science

Department Name: Biology

College/School/Division Name: Natural Sciences and Mathematics

Term: Spring 2020

Course Credits: 1

Class Meeting Days: Thursdays

Class Meeting Hours: 1-1:50PM

Class Location: Henry Hall 109

Instructor Name: Mark Speck, PhD

Email: mark.speck@chaminade.edu

Phone: (808) 739-7496

Office Location: Tredtin DSC 1

Office Hours: 9AM - 1PM

Instructor Website: <https://datascience.chaminade.edu>

1. University Course Catalog Description

An introduction to 'big data', data science, visualization and analytics in the areas of biomedicine, social sciences and the natural and built environments.

2. Course Overview

This course is intended to be an examination on the role of technology and computational tools available to modern life scientists. Students will be exposed to a breadth of applications used in the information age to answer important biological questions across multiple disciplines. Computers enable scientists to improve data quality and laboratory efficiency more effectively than just a decade ago. Computational tools help researchers probe and model complex biological phenomena and more quickly react and adjust to changes in their fields of science. It's a quickening of discovery, which can increase breakthroughs, and health benefits from research by transdisciplinary teams. The Digital Science course is an introduction to data sciences and scientific questions and how information technologies have impacted science. The expectation is that students will see the amazing scope of information directly available to researchers and the need to integrate other disciplines (e.g. computer science or information technology) into solving challenging scientific questions.

3. Course Learning Outcomes and Linkage to Program Learning Outcomes

At the conclusion of BI 104, students will:

PROGRAM LEARNING OUTCOME <i>I = introduced</i> <i>D = developed</i> <i>M = mastered</i>	Scientific method and hypothesis testing (PLO1)	Data visualization, statistics, interpretation and science communication (PLO2)	Literature and computational resources (PLO3)	Chemical and physical principles, biological organization (PLO4)	Genetics, epigenetics, adaptation and evolution (PLO5)	Disease etiology, mechanisms, Therapeutics and epidemiology (PLO6)	Career opportunities and pathways (PLO7)
BI104 Digital Biology	I	I	I				I
Describe how vast amounts of data are being generated and integrated into science			X				
Describe or conceptualize how data is used to model scientific information from the cellular to the global scale		X	X				
Describe how various scientific disciplines are now integrated to solve biological questions.		X					X
Describe the six different levels of scientific questions.	X	X					X

4. Course Prerequisites

None

5. Required Learning Materials

Materials will be provided on Canvas or in class as needed

6. Technical Assistance for Canvas Users:

Search for help on specific topics at help.instructure.com. [Chat live with Canvas Support 24/7/365](#). Watch this [video to get you started](#) with online guides and tutorials. Contact the Chaminade IT Helpdesk for technical issues: helpdesk@chaminade.edu, or call (808) 735-4855

7. Assessment.

Attendance	20 points
Homework	80 points
Group Projects	100 points
Total	200 points

Grading will be based on student points earned from attendance, homework, and group projects. Projects will be developed based on material and sources discussed in class.

9. Grading Scale

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

A	Excellent	>90%	180-200 points or more
B	Good	>80%	160-179 points
C	Average	>70%	140-159 points
D	Below Average	>60%	120-139 points
F	Failure	<60%	119 points or less

10. Course Schedule

Week	Dates	Lecture Topic
1	16 Jan	Scientific Questions
2	23 Jan	Descriptive Questions
3	30 Jan	Descriptive Questions, continued
4	6 Feb	Exploratory Questions
5	13 Feb	Exploratory Questions, continued
6	20 Feb	Inferential Questions
7	27 Feb	Inferential Questions, continued
8	5 Mar	Group projects
9	12 Mar	Predictive Questions
10	19 Mar	Predictive Questions, continued
11	26 Mar	Spring Recess
12	2 Apr	Causal Questions
13	9 Apr	Good Friday
14	16 Apr	Causal Questions, continued
15	23 Apr	Mechanistic Questions
16	30 Apr	Group projects
17	May	Group projects, continued

11. 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 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.

12. Additional departmental and university policies

12.1. Late Work Policy

Requests for extensions due to extenuating circumstances (medical problems, for example) will be considered but in general work received after the deadline will not be graded. Computer problems are not an excuse for late work.

12.2. Grades of "Incomplete"

Students and instructors may negotiate an incomplete grade when there are specific justifying circumstances. An Incomplete Contract (available form 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.

12.4. Instructor and Student Communication

Questions for this course can be emailed to the instructors at mark.speck@chaminade.edu and laura.tipton@chaminade.edu. Online, in-person, and phone conferences can be arranged. Response time will take place up to 3 days.

The University provides a Chaminade email address for all students. Official Chaminade communications will be sent to the students' Chaminade email address and instructors will use only this email to communicate with students. It is the responsibility of the student to check their email frequently. Report email-related problems to the Helpdesk at 808-735-4855 or helpdesk@chaminade.edu

12.5. Cell phones, tablets, and laptops

Music Devices and Cellular Phones: Unless specifically permitted by your 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.

12.6. Disability Access

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).

12.7. 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. Should you want to speak to a confidential source you may contact the following:

- Chaminade Counseling Center| 808 735-4845.
- Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role

12.8. Attendance Policy

The following attendance policy is from the 2018-2019 Academic Catalog (p. 57-58):
Students are expected to attend regularly all courses for which they are registered. Student

should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete 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 Math 1 (808) 440-4204). It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially **withdrawing** may receive a failing grade.

Unexcused absences equivalent to more than a 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.

Students with disabilities who have obtained accommodations from the Chaminade University of Honolulu ADA Coordinator may be considered for an exception when the accommodation does not materially alter the attainment of the learning outcomes. Federal regulations require continued attendance for continuing payment of financial aid. When illness or personal reasons necessitate continued absence, the student should communicate first with the instructor to review the options. Anyone who stops attending a course without official withdrawal may receive a failing grade or be withdrawn by the instructor at the instructor's discretion.

Class begins at 11:30 AM and ends at 12:50 PM; there is no accepted variation to this schedule.

12.9. Academic Conduct Policy

See the current Undergraduate Academic Catalog and the Student Handbook available from Student Affairs.