



College of Business Innovation & Technology

Computational Sciences

DS 400 Bayesian Statistics

DSC, TTH 2:30 - 3:50 pm | Credits: 3 | Term: Fall 2026

Instructor Information

Instructor	Connor Flynn
Email	connor.flynn@chaminade.edu
Phone	
Office Location	Tredtin Hall
Office Hours	Tuesdays 1:00 - 2:30
Virtual Office	https://chaminade.zoom.us/j/94829872616?jst=2
Virtual Office Hours	Tuesdays 1:00 - 2:30

Communication

Communication will happen via email and on the Canvas messenger. In-person questions are welcome before and after every class

School & Department

School	Business, Innovation, & Technology
Location	Kiefer Hall
Phone	
Questions?	Contact your instructor or the School of Business, Innovation, & Technology

Course Description & Materials

Catalog Description

MA-331

Course Snapshot

Modality	Face-to-Face
Meeting Location	Tredtin Hall, Data Science Center
Meeting Days/Times	TTH 2:30 -3:50 pm
Time Allocation	This is a three-credit hour course requiring 135 clock hours of student engagement, per the official CUH Credit Hour Policy. Over the 15 weeks

	<i>of this course, students will spend 37.5 hours in class, 48 hours researching and writing a ten-page essay, 1 hour each week writing reflection papers (15 hours total), and 10.5 hours studying for and taking the final exam. There will be an additional 24 hours of work required beyond what is listed here (course readings, homework assignments, etc.), averaging 1.6 hours each week.</i>
Required Materials	<i>R, R-Studio, Github</i>
Canvas	Course materials, announcements, and grades are posted to Canvas (chaminade.instructure.com).

Learning Outcomes

Program Learning Outcomes (PLOs)

Upon completion of [degree program name], the student will be able to:

1. Describe foundational computer organization, architecture, computing resources, and systems;
2. Describe foundational mathematical concepts and operations towards design, development, and analysis of applications;
3. Apply programming language towards application development;
4. Integrate an awareness of ethical issues and collective standards to positively influence the application of data science to service, justice and peace in working towards solutions for societal problems.

Course Learning Outcomes (CLOs)

Upon completion of DS400, the student will be able to:

1. Understand the difference between frequentist and Bayesian statistical approaches
2. Perform several bayesian analyses appropriate for various research questions and dataset characteristics
3. Code in R utilizing the rstan and brms packages
4. Effectively communicate methods, results and limitations of Bayesian analyses

Marianist Values

An education in the Marianist Tradition is marked by five principles. Reflect on how this course relates to one or more:

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

Native Hawaiian Values

Education is central to both Marianist and Native Hawaiian culture — both seek transformative, value-centered learning that serves the marginalized. This is reflected in the ‘Ōlelo No’eau (Hawaiian proverbs) below:

1. **Educate for Formation in Faith (Mana):** E ola au i ke akua (‘Ōlelo 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 (‘Ōlelo No’eau 1957) — Acquire skill and make it deep.

3. **Educate in Family Spirit ('Ohana):** 'Ike aku, 'ike mai, kōkua aku kōkua mai ('Ōlelo No'eau 1200) — Recognize others, be recognized, help others, be helped.
4. **Educate for Service, Justice and Peace (Aloha):** Ka lama kū o ka no'eau ('Ōlelo 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 ('Ōlelo No'eau 203) — All knowledge is not taught in the same school.

Alignment of Course Learning Outcomes

	CLO 1	CLO 2	CLO 3	CLO 4
Marianist Values	☒			
PLOs				☒
Native Hawaiian Values		☒		
Gen Ed Outcomes(if applicable)				

Attendance & In-Class Participation

Attendance Policy

Attendance is mandatory and part of the final grade for the class. More than 3 unexcused absences will result in a loss of credit for attendance

Quick Reference — Absence Thresholds:

Excused Absence	<i>illness with documentation, family emergency, University-sponsored activity, etc</i>
Unexcused Absence	<i>any absence not pre-approved or documented</i>
Warning Threshold	<i>More than 2 unexcused absences</i>
Grade Penalty	<i>More than 3 unexcused absences — final grade lowered by one 2 points</i>
Course Failure	<i>More than 10 unexcused absences — student may receive a failing grade</i>
Late Arrival / Early Departure	<i>Arriving more than 15 minutes late counts as a tardy; 2 tardies = 1 absence</i>

In-Class Participation Expectations

Active, respectful engagement is essential. Students are expected to come prepared and contribute meaningfully to discussions, activities, and collaborative work.

Students are expected to:

- Come prepared — complete readings and activities before each session.
- Participate actively in discussions and group work, demonstrating critical thinking.
- Engage respectfully and honor diverse perspectives.

- Use personal devices for course purposes only unless otherwise directed.
- Submit work by established deadlines to support course pacing.

Course Activities

In-Class Activities	<i>We will write r code to perform bayesian analyses on a variety of datasets</i>
Homework / Assignments	<i>Homework will be graded based on correctness and effort</i>
Quizzes / Exams	<i>None</i>
Projects	<i>Final is a group project</i>

Course Policies

Late Work	<i>Late work will be accepted but with points deducted</i>
Make-Up Work	<i>None</i>
Extra Credit	<i>No extra credit is available in this course</i>
Incomplete Grade	<i>Incomplete grades will be granted based on the request</i>
Syllabus Changes	The instructor reserves the right to modify this syllabus. Changes will be announced in class and posted to Canvas.

Final Grades

Final grades are submitted to Self-Service (selfservice.chaminade.edu):

Grade	Range
A	90% and above
B	80–89%
C	70–79%
D	60–69%
F	59% and below

Important Information

Academic Honesty

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, plagiarism, **and unauthorized and/or undisclosed AI usage**, in addition to more obvious dishonesty. See catalog section *Student Use of Artificial Intelligence in Academic Work* for further information.

Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Director of the Academic College. Punishment for academic dishonesty will be determined by the instructor, Director, and the Dean of Academic College and may include an “F” grade for the work in question, an “F” grade for the course, academic notice, or dismissal from the University.

AI (Artificial Intelligence) Statement

Chaminade University recognizes the increasing role of artificial intelligence (AI) technologies in academic and professional environments. AI encompasses, but is not limited to, generative AI platforms, automated writing or content generation software, coding assistants, and similar tools. Students must ensure all submitted work genuinely reflects their knowledge and effort. Using AI to produce or significantly complete graded assignments, exams or other academic tasks – defined as use that substitutes for or substantially replaces a student’s own analysis, reasoning or written expression – without explicit instructor approval is considered academic misconduct and will be dealt with according to the University’s Academic Honesty Policy.

If an instructor has reasonable grounds to question whether submitted work genuinely reflects a student's own knowledge, authorship, or mastery of course material — or whether it meets the course's expectations for AI use — the instructor may require the student to provide additional or alternative evidence of authorship and content mastery. Such evidence may include drafts, notes, revision history, source materials, process explanations, oral discussion, in class work, or completion of an alternative assessment. A student’s refusal or inability to provide such evidence may be considered, along with other available information, in evaluating whether the work meets course requirements and stated learning outcomes. Instructors will not rely solely on AI detection software or other automated tools in making grading or academic integrity determinations. Such determinations will be based on the totality of the available information and handled in accordance with applicable University policies and procedures. See the catalog section *Student Use of Artificial Intelligence in Academic Work* for further information.

Title IX and Nondiscrimination

Chaminade University of Honolulu is committed to providing a learning, working and living environment that promotes the dignity of all people, inclusivity and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. For pregnant and parenting students, I am also obligated to provide you with similar resources for support and protections available to you. My goal is to make sure that you are aware of the range of options available to you and have access to the resources and support you need.

Contact information and reporting options: chaminade.edu/titleix/nondiscrimination/. File a report via the [Campus Incident Report Form](#).

Nondiscrimination Policy and Notice of Nondiscrimination

The university is committed to comply with all State and Federal statutes, rules, and regulations which prohibit discrimination. The university is committed to a policy of nondiscrimination on the basis of race, sex, gender identity and expression, age, religion, color, national origin (including shared ancestry and ethnic characteristics), ancestry, citizenship, disability, genetic information, marital status, breastfeeding, arrest and court record (except as permissible under State law), sexual orientation, or status as a covered veteran. Inquiries about Title IX or general Civil Rights concerns may be referred to the University's Title IX Coordinator, the U.S. Department of Education's Office for Civil Rights, or both and contact information may be found [HERE](#). *On-campus Confidential Resources may also be found here at [CAMPUS CONFIDENTIAL RESOURCES](#).*

The University's Nondiscrimination Policy and Grievance Procedures can be located on the University webpage at: <https://chaminade.edu/compliance/title-ix-nondiscrimination-policies-procedures/>.

To report information about conduct that may constitute sex discrimination or make a complaint of sex discrimination under Title IX, please refer to the [Campus Incident Report form](#). Chaminade University of Honolulu prohibits sex discrimination in any education program or activity that it operates.

The NOTICE of NONDISCRIMINATION can be found here: [Notice of Nondiscrimination](#).

Student with Disabilities Statement- Kōkua 'Ike

Accessibility Services recognizes disability as a valued aspect of diversity and ensures equal access to the educational environment in accordance with Section 504 of the Rehabilitation Act; the Americans with Disabilities Act, as amended; and the principles and professional standards of the Association on Higher Education and Disability. Access is supported through reasonable accommodations and referrals to campus and community resources.

Appointments with the Accessibility Services Coordinator are available through Stellic at <https://chaminade.stellic.com> and may be held virtually or in person. Drop-in appointments are also welcome.

Students seeking support must meet with the Accessibility Services Coordinator as early as possible, even if they are unsure whether they have appropriate documentation of their disability or its impacts. The Accessibility Services Coordinator prioritizes listening to students's experiences and will discuss any documentation needs during the initial intake meeting. Students may seek support at any time.

Learn more at <https://chaminade.edu/ada-accommodations>

Assessment of Student Work

Chaminade University may use student work anonymously to assess achievement of course, program, and institutional learning outcomes as part of ongoing quality improvement efforts.

Campus Resources & Support Services

The following resources are available to all Chaminade students. Reach out early — these services exist to support your success.

Resource	Description	Contact / Website
Accessibility Services (Kōkua 'Ike)	Accommodations under Section 504 and ADA. Contact early — appointments via Stellic, virtual or in person.	ada@chaminade.edu chaminade.edu/ada-accommodations

Resource	Description	Contact / Website
Tutoring & Academic Coaching (Kōkua 'Ike)	Tutoring and Academic Coaching Services support students' progression toward their academic, personal, and professional goals with clarity and intention. Services include individualized support in English, math, nursing, sciences, and social sciences, as well as guidance in developing goals and study strategies.	chaminade.edu/tutoring-academic-coaching-services
Career Services	Career Services supports students throughout their career journeys. Services include individualized job search strategy coaching, resume reviews, job interview coaching, and access to career-related resources and opportunities.	chaminade.edu/career-services
Basic Needs Resources	Support for food insecurity, housing instability, and other basic needs.	chaminade.edu/basic-needs/
Title IX / Nondiscrimination	Reporting and support for sex discrimination and gender-based violence. Campus Incident Report Form available online.	chaminade.edu/titleix/resources-and-support/
Hazing Prevention	Confidential support, crisis intervention, and reporting for any type of abuse including hazing.	hazingpreventionnetwork.org/athlete-helpline/
Campus Safety / SafeSwords	Security escort service for anyone who feels unsafe walking alone on campus at any time of day. Call security and a professional will escort you to your destination.	chaminade.edu/student-life/security/campus-safeswords-program/
CUH Alert Emergency Notification	Emergency text system. Register your cell number via the Chaminade portal and confirm the text to complete enrollment.	chaminade.edu

Weekly Course Schedule

Note: The instructor reserves the right to modify this schedule. Changes will be announced in class and posted to Canvas.

Wk of	Theme	Topics / Readings	Due Dates
8/17	Foundations of Bayesian Inference	Bayes' Theorem — priors, likelihoods, posteriors; screening-test statistics (CDC/USPSTF)	
8/24	Rates, Continuous Estimates & Intro to Pooling	Beta-Binomial rate estimation; Normal model & credible intervals; intro to partial pooling — Waikiki Roughwater Swim results	

8/31	Classification with Bayes	Naive Bayes classifier — Enron-Spam / SpamAssassin corpus	
9/7	Weighing Evidence	Bayes factors & likelihood ratios — AI text watermarking detection statistics	Assignment 1
9/14	Combining Uncertain Sources	Hierarchical / multilevel models, partial pooling formalized — public polling data	
9/21	Regression & Simulation-Based Inference	Bayesian logistic regression; intro to MCMC — IBM Telco Customer Churn	
9/28	Regression & Simulation-Based Inference (cont.)	Bayesian logistic regression; MCMC sampling (PyMC/Stan) — Telco Customer Churn	
10/5	Experimentation & Decision-Making	Bayesian A/B and A/B/n testing — Upworthy Research Archive	Assignment 2
10/12	Fall Break	No class	
10/19	Time Series & Change	Bayesian time series & changepoint detection — NOAA temperature anomalies	
10/26	Review & Synthesis	Review of core analyses; midterm project checkpoint — all course datasets	Presentation
11/2	Guest Perspectives	Guest Lecture — Dr. Helen Turner	
11/9	Guest Perspectives & Applied Practice	Guest Lecture — Dr. Helen Turner (11/10); Open lab / applied practice (11/12)	
11/16	Final Project Preparation	Final project work sessions	Assignment 3
11/23	Final Project Prep & Thanksgiving	Final project work session (11/24); Thanksgiving — no class (11/26)	
11/30	Final Presentations & Wrap-Up	Final Presentations (12/1); Feedback Implementation Workshop (12/3)	Final project due & presented