Course Syllabus

Course Number: CS 202

Course Title: Programming in Python

Department Name: Natural Sciences and Mathematics

College/School/Division Name: Chaminade University of Honolulu

Term: Spring 2020

Course Credits: 3

Class Meeting Days: Mondays, Wednesdays, and Fridays

Class Meeting Hours: 1:30-2:20

Class Location: Tredtin Hall, Room DSC

Instructor Name: Matthew Cochran, PhD

Email: matthew.cochran@chaminade.edu

Phone: (808) 739-8361

Office Location: Henry Hall 123A

Office Hours: To be announced

1. University Course Catalog Description

This course is an introduction to Python that will cover the python topics and language. This course will include lectures, discussions, assignments, hands-on experiences with real data, and a project that could be used for future classes and investigation. The goal of the course, it will prepare students for the next data science courses and practice by providing students with skills, knowledge, techniques, and a data science mindset. Students in this course will learn the data science process of collecting, storing, and curating data; ingestion and wrangling data; Python language; Python used for database systems; analyzing data using Python; visualizations; and reporting the results of the analysis.

2. Program Learning Outcomes

Upon completing the B.S. degree program in Data Science Analytics and Visualization the student will demonstrate the following:

1. Source, describe and curate large data sets ('big data') that may not be amenable to conventional statistical analysis, including domain and file specific metadata
2. Demonstrate understanding of foundational mathematical and statistical concepts and operations that underlie data management, analysis and interpretation
3. Apply computational approaches and tools such as R, SQL and Python languages to problems associated with data management, analysis and interpretation
4. Explain and identify the concepts of "Big Data" storage structures, specifically NoSQL DBs and the tools built around Map/Reduce that allow data scientists to use them
5. Apply basic data modeling, identifying and applying predictive models to support decision- making
6. Analyze and apply an ethical framework and collective standards in which data scientists must operate, considering data confidence and context in the design of systems or practices that ensure equity, validity, confidence and privacy of data
7. Plan and execute data science tasks within multidisciplinary teams
8. Develop and implement approaches to effective data translation, dissemination and communication between domains, stakeholders and the public
9. Perform a domain-specific capstone project addressing a stakeholder-generated use case

3. Course Learning Outcomes and Linkage to Program Learning Outcomes

At the conclusion of DS 101, students will:

Course Learning Outcomes	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
1. Collect, store, and curate data.	X		X						
2. Explain the process of data ingestion and wrangling.	X		X						
3. Understand the language basics of Python.			X						
4. Apply Python in developing a project.			X				X		
5. Apply Python in querying a database.			X						
6. Apply Python to perform various statistical analyses.			X				X		
7. Produce, synthesize, interpret, evaluate, and report results and visualizations to various audiences.			X				X	X	

4. Course Prerequisites

DS100, MA103

5. Required Learning Materials

Any learning materials will be provided on Canvas 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

Homework and Attendance	40 points
Mini Project 1	15 points
Mini Project 2	15 points
Final Project Proposal	15 points
Final Project	15 points
Total	**100 points**

Grading will be based on student points earned from attendance, quizzes, and project development milestones. Projects will be developed based on material and sources discussed in class. A team approach to problem solving will be used to help individual develop their unique projects.

8. 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 - 100	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	60 - 69	Inferior work of the lowest passing grade, not satisfactory for prerequisite course work.
F	< 60	59 points or less: Failed to grasp the minimum subject matter; no credit given

9. Course Schedule

Week	Date	L#	Lecture Topic	Text	Reading
	Jan 13	1	Introduction to course		
1	Jan 15	2	Numbers	van Rossum	3.1.1
	Jan 17	3	Strings	van Rossum	3.1.2
	Jan 20	**H1**	**Martin Luther King Jr Day**		
2	Jan 22	4	Lists	van Rossum	3.1.3
	Jan 24	5	If statements	van Rossum	3.2 & 4.1
	Jan 27	6	For statements	van Rossum	4.2 & 4.3
3	Jan 29	7	Functions	van Rossum	4.6 & 4.7
	Jan 31	8	Function arguments	van Rossum	4.7.2 to 4.7.4
	Feb 03	9	Lambda expressions; Coding style	van Rossum	4.7.5 & 4.8
4	Feb 05	10	More on lists	van Rossum	5.1 & 5.11
	Feb 07	11	List comprehensions; The del statement	van Rossum	5.1.3 to 5.2
	Feb 10	**P1**	**Mini Project 1**		
5	Feb 12	12	Tuples; Sets	van Rossum	5.4 & 5.4
	Feb 14	13	Dictionaries; Looping techniques	van Rossum	5.5 & 5.6
	Feb 17	**H2**	**Presidents' Day**		
6	Feb 19	14	Fancier output formatting	van Rossum	7.1 to 7.1.3
	Feb 21	15	Names and objects	van Rossum	9.1 to 9.2.1
	Feb 24	16	Classes	van Rossum	9.3 to 9.3.1
7	Feb 26	17	Class objects	van Rossum	9.3.2 to 9.3.5
	Feb 28	18	String pattern matching	van Rossum	10.5
	Mar 02	19	Object Creation; Getting and viewing data	McKinney	6.1 to 6.3.2
8	Mar 04	20	Selection; Boolean Indexing; Setting	McKinney	6.3.3 to 6.3.5
	Mar 06	21	Missing Data; Operations; Histogramming	McKinney	6.4 to 6.5.4
	Mar 09	**P2**	**Mini Project 2**		
9	Mar 11	22	Merge; Concat; Join; Append	McKinney	6.6 to 6.6.3
	Mar 13	23	Grouping; Reshaping; Pivot Tables	McKinney	6.7 to 6.8.2
	Mar 16	24	Time Series; Categoricals	McKinney	6.9 to 6.10
10	Mar 18	25	Categorical variables	Waskom	categorical data
	Mar 20	26	One quantitative variable; Shape and center	Waskom	distributions
-			Spring Break		
	Mar 30	27	One quantitative variable; Spread	Waskom	distributions
11	Apr 01	28	Boxplots and quantitative/categorical relationships	Waskom	categorical data
	Apr 03	29	Two quantitative variables; Scatterplots and correlation	Waskom	statistical
	Apr 06	30	Two quantitative variables; Linear regression	Waskom	linear
12	Apr 08	31	Data visualization and multiple variables	Waskom	statistical
	Apr 10	**H3**	**Good Friday**		
	Apr 13	**P3**	**Final Project Proposal**		
13	Apr 15	32	Sampling distributions	Waskom	distributions
	Apr 17	33	Confidence intervals	scipy.org	
	Apr 20	34	Hypothesis tests	scipy.org	
14	Apr 22	35	Measuring evidence with p-values	scipy.org	
	Apr 24	36	Determining statistical significance	scipy.org	
	Apr 27	37	Prep for project		
15	Apr 29	38	Prep for project		
	May 01	39	Prep for project		
Tues	May 07	**P4**	**Final Project Presentation 11:00 – 1:00**		

10. 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.

11. Additional departmental and university policies

11.1. 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.

11.2. Grades of "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.

11.3. Instructor and Student Communication

Questions for this course can be emailed to the instructors at matthew.cochran@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

11.4. 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.

11.5. 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).

11.6. 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

11.7. 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.

11.8. Academic Conduct Policy

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