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| I. | HCCC Logo-BlackleftsideCourse ID (department & number): DSC-217 and CSC-217 |
| II. | Course Name: Fundamentals of Data Science |
| III. | Number of Credits Awarded for Course: 3 |
| IV. | Prerequisite or Co-requisite courses or academic standing (if applicable): CSC-118 Python Programming |
| V. | Indicate if New or Modified Course: New |
| VI. | Semester and Year Course will First be Offered: Fall 2023 |
| VII. | Name and Telephone Number and/or e-mail address of department chair or other appropriate contact person:  Heather DeVries, Academic Representative to NJ Transfer  [hdevries@hccc.edu](mailto:hdevries@hccc.edu)  201-360-4660 |
| VIII. | Detailed Course Description: This course will introduce the students to a data science cycle, including manipulating, processing, cleaning, and visualizing data in Python language + Jupyter Notebook environment, for making reasonable decisions and communicating results. Lab hours reinforce concepts introduced and during lecture. |
| IX | Outline of Course Objectives  *Upon successful completion of this course, students will be able to*:   1. Explain the concepts of Data Science 2. Outline the various phases of data analysis including acquiring, purifying, organizing, analyzing, manipulating, processing, and visualizing data 3. Use Python built-in data structures and add-on libraries like pandas and NumPy to manipulate data. 4. Use Python plotting libraries to visualize data 5. Apply data science concepts and skills to solve problems with real-world data sets(using hands-on labs). 6. Assess how data analysis can advance research in all applicable disciplines. |
| X. | Texts, Journals and Other Materials used in Course  Python for Data Analysis 2/E by Wes McKinney  ISBN-10: 1491957662 • ISBN-13: 1491957660 ©2018 • O’Reilly |
| XI. | Grade Determinants  Homework Assignments and  In-class Exercise (10%) /labs (20%) 30%  Exams 3 exams (20% each) 60%  Analyze and present a 10%  research article from the *Data Science* *Journal* |
| XII. | Number of Papers & Examinations  Students analyze a research article from the *Data Science* *Journal* (Homework assignment of week 14). <https://datascience.codata.org/>  <https://datascience.codata.org/articles/>  In the 500–1000-word writing, students should:   1. Briefly describe the article and explain the content of the article to the reader. When reading the article, students must find detailed information that identifies the topic of the article. 2. Determine the author’s purpose or why the author thinks the research topic is relevant and important. 3. Determine the research methods. 4. Check whether the author has cited other research articles and conducted similar research. If so, when talking about research methods and evidence, students should mention and explain it. |
| XIII. | Schedule of Topics to be Covered   |  |  |  |  | | --- | --- | --- | --- | | **Session** | **Topic** | **Lab** | **SLO** | | 1 | Introduction to Data Science | Install Anaconda (Python 3) ▸ https://www.anaconda.com/download | 1 | | 2,3 | Python Basics and Jupyter Notebook | Installing Python and Jupyter Notebook ▸ Running Jupyter Notebook | 1,2,4 | | 4,5 | Introduction to Python Data Science libraries | Lab 1 | 1,3 | | **6** | **Review and Exam 1** | | | | 7 | Data loading and storage.  Data cleaning and preparation | Lab 2 | 1,2 | | 8,9 | Data wrangling \*\* | Lab 3 | 4, 5 | | **10** | **Review and Exam 2** | | | | 11,12 | Data visualization | Lab 4 | 4, 5 | | 13 | Data aggregation \*\* | Lab 5 | 4, 5 | | 13 | Time Series \*\*\* | Lab 6 | 4, 5 | | 14 | Analyze and present a research article from the *Data Science* *Journal* [*https://datascience.codata.org/articles/*](https://datascience.codata.org/articles/) | | **6** | | 15 | Review and Final Exam | | | |