**Global Learning Initiatives Program Course Syllabus**

Please complete the following form in English. The information will be updated to the Global Learning Initiatives Program website for students’ reference. If you will be offering more than one course, please fill out one form per course offered. Examples in grey.

**Course Information**

|  |  |
| --- | --- |
| Course Name  \*provide the **English** course name of the course. | Lab on Python for data science and machine learning |
| Lecturer(s)  \*provide the lecturers’ **English** name. If there are more than one lecturer, please indicate all lecturers in the column. | Prof. Stefano Rini |
| Course Description  \*briefly describe the contents covered in the courses. | Python is an easy to use, open-source and versatile programming language that is especially popular among those new to programming. It is already the number one software package for those teaching introduction to computer science courses. It is concise, easy to read, and can be used for a variety of industry needs including: web development, data analytics, core software development, and a wide range of scientific and mathematical applications.  Python also has numerous libraries for data manipulation and analysis as well as a very active development community that continually updates and creates new packages. It has been adopted by a wide variety of industries and applications including data science, machine learning, data analytics, predictive analytics, business intelligence, and web analytics.  This course will rely on Python to introduce various data analysis and visualization techniques to solve real-world problems in different domains. Topics include data representation, manipulation and clearing, visualization, regression, convolutional and recurrent neural networks, reinforcement learning, model development and evaluation with most up-to-date Python modules and popular toolkits. |
| Course Objectives  \*list out knowledge or skills students should acquire upon completion of course. | Explain the fundamental concepts of data science using python. The course will also help you to analyze, manipulate and implement machine learning methods using various python libraries such as NumPy, Pandas and Scikit-learn |
| Suggested Proficiencies  (if any)  \*list preferred knowledge or skills students should have before taking the course. | None |
| Reading List  (if any)  \*list out the textbooks, references, or other reading materials. | Intro to Python for Computer Science and Data Science: Learning to Program with AI, Big Data and The Cloud by Paul J. Deitel , and Harvey Deitel |
| Grading Criteria  \*how would the students be assessed during the course. | The weekly quizzes will constitute 75% of the final grade, the project 25%. |

**Course Schedule**

Please complete the following table with the dates and expected course topics. If there are more than one lecturers instructing the course, please also indicate the lecturer for each class.

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| --- | --- | --- | --- |
| Class | Date (YYYY/MM/DD) | Course Topic | Lecturer |
| 1 | Sept. 14 | Course Introduction, overview of Python, basic elements of Python, and first Python program | Stefano Rini |
| 2 | Sept. 21 | Fundamental programming concepts I including Syntax and semantics, variables, expressions, assignments, selections, and loops | Stefano Rini |
| 3 | Sept. 28 | Fundamental programming concepts II | Stefano Rini |
| 4 | Oct. 4 | Functions and fundamental data structures I | Stefano Rini |
| 5 | Oct. 11 | Functions and fundamental data structures II | Stefano Rini |
| 6 | Oct. 18 | File IO and exception handling | Stefano Rini |
| 7 | Oct. 25 | Algorithms and recursion | Stefano Rini |
| 8 | Nov. 2 | Quiz | Stefano Rini |
| 9 | Nov. 9 | Python libraries and Data collection | Stefano Rini |
| 10 | Nov. 16 | Mathematical and scientific computing | Stefano Rini |
| 11 | Nov. 23 | Data manipulation and visualization | Stefano Rini |
| 12 | Nov. 30 | Data manipulation and visualization I | Stefano Rini |
| 13 | Dec. 7 | Machine learning I | Stefano Rini |
| 14 | Dec. 14 | Machine learning II | Stefano Rini |
| 15 | Dec. 21 | Case Study: Classification with k-Nearest Neighbors and the Digits Dataset | Stefano Rini |
| 16 | Dec. 28 | Case Study: Classification with k-Nearest Neighbors and the Digits Dataset II | Stefano Rini |
| 17 | Jan. 4 | Project presentation I | Stefano Rini |
| 18 | Jan. 11 | Project presentation I I | Stefano Rini |