Federal University of Santa Catarina (UFSC)
Technological Center (CTC)
Chemical and Food Engineering Department (EQA)

Graduate Program in Chemical Engineering

Teaching Plan **2025-1**			
I. Course Identification			
Code	**Course Name**	**Credits**	**Trimester**
ENQ410034	Introduction to Python for Research	3	1

II. Professor

Sergio Yesid Gómez González – sergio.gomez@ufsc.br

III. Teaching Assistant

N/A

IV. Course Target Audience

Graduate students in Chemical Engineering (MSc and PhD level)

V. Syllabus

Python Basics, Objects and Methods, Manipulating Objects, Numpy, Symbolic Mathematics, Thermo, Data Visualization-Manipulation, Statistics.

This course considers the Early Assessment Examination (EAA) in the Graduate Program in Chemical Engineering (PosENQ) at UFSC in agreement with the Normative Resolution nº 01/2021.

VI. Objectives

At the end of the course, the student should be able to use Python as a code programming language and identify-use the basic structures such as math operations, conditionals, booleans, loops, and arrays. It is also expected that the students become familiar with the use of standard scientific Python environment (Numpy and Scipy), symbolic mathematics (SymPy), development and visualization of graphs (Matplotlib), and using simple and efficient tools to store, manipulate and generate data and analysis (Pandas, Thermo, Scikit-learn). Students are also expected to develop the ability to apply the foundations of the discipline to applied and research problems.

VII. Program Content

Understand the concepts of basic operations, operations using booleans, and application of conditionals, and loops under the computer programming language Python.

Use of standard scientific Python environment and other useful packages; Numpy-Scipy, Thermo, and SymPy).
Development and visualization of data and graphs in Python using Matplotlib.
Store and manipulate data using Pandas.
Introduction to data analysis using Scikit-learn.
Applied Case Study.

VIII. Teaching Methodology

The classes will present the general idea and relevant discussions of the context of each topic, developing the material using the blackboard and additional resources such as slides, computing software, including:

- Explanation and software implementation of the content involving problems with applications.
- Exercise-solutions drills to fix the content and of discussions related to the topics covered.
- Case study.

IX. Assessment Methodology

The final grade will be composed by the following elements:

- Assignments (70%)
- Case Study (30%)

The application of the Early Assessment Examination will be offered (a single test), according to Normative Resolution PósENQ 01/2021, considering all topics of the Course. The assessment grade will replace the other assessments and will be applied in the first week of class, at a time to be defined after the first class.

X. Syllabus

Lecture	Content
1 14/03 4h	Introduction to the Course
2 21/03 4h	Operations, Booleans, Conditionals, and Loops

3 28/03 4h	Scipy - Numpy
4 04/04 4h	Sympy
5 11/04 4h	Thermo
- 18/04 -	Good Friday
6 25/04 4h	Matplotlib
- 02/05 -	Day-OFF
7 09/05 4h	Pandas
8 16/05 4h	Scikit-learn
9 23/05 4h	Case Study
10 30/05 4h	**Term Closure**

XI. Bibliography

Open Access Options and Material available in the Moodle system
Online books at BU/UFSC: http://portal.bu.ufsc.br/a-biblioteca-universitaria-daufsc-oferece-acesso-a-livros-eletronicos-em-diversas-areas-do-conhecimento/

IX. Additional Bibliography

- Hans Petter Langtangen, A Primer on Scientific Programming with Python, 5th Edition, Springer, 2016.
- John Hunt, A Beginners Guide to Python 3 Programming, 1st Edition, Springer, 2019
- Rubin H. Landau, Manuel J. Páez and Cristian C. Bordeianu, Computational Physics, 3rd Edition, Wiley-VCH, 2015

Federal University of Santa Catarina (UFSC)
Technological Center (CTC)
Chemical and Food Engineering Department (EQA)

Graduate Program in Chemical Engineering

Documento assinado digitalmente
Sergio Yesid Gomez Gonzalez
Data: 10/03/2025 14:46:10-0300
CPF: ***.911.889-**
Verifique as assinaturas em https://v.ufsc.br

Professor

Department Head

Documento assinado digitalmente
Agenor Furigo Junior
Data: 10/03/2025 16:52:34-0300
CPF: ***.789.438-**
Verifique as assinaturas em https://v.ufsc.br

Graduate Program
Coordinator