2. Introduction to Programming

Module Name	:	Introduction to Programming
Module Level	:	Bachelor
Code, if applicable	:	23H06110202
Subtitle, if applicable	:	-
Courses, if applicable	:	Introduction to Programming
Semester(s) in which the module is taught	:	II (Second Semester)
Module coordinator(s)	:	Dr. Muhammad Alimuddin, Eng.
Lecturer(s)	:	Dr. Muhammad Alimuddin, Eng. and Dr. Muhammad Taufiq Rafie
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory course in the first year for Bachelor Degree in Geophysics
Type of teaching, contact hours	:	This course is delivered through Lectures (i.e., Project/Case-based learning), complemented by structured assignments (paper review, project/case evaluation) and independent study. Contact hours consist of 100 minutes lectures per week, plus 120 minutes per week for each of the following: structured assignments and independent study
Workload	:	Total workload is 90 hours per semester, consisting of 28 hours for lectures, and 31 hours each for structured assignments and independent study
Credit points	:	2 SKS (3.2 ECTS)
Requirements according to the examination regulations	:	Students are eligible to attend the examination if their absences are less than 20% of the lectures
Recommended prerequisites	:	-
Module objectives/intended learning outcomes	:	After completion of this module, students will be able to: CLO 1. Able to implement simple programs using Python, Jupyter Lab and Google Colab and GIT; CLO 2. Able to apply Python for scientific programming. The following is the mapping of the ILO and the CLO of this course:

		<table><tr><td></td><td>ILO 5</td><td>ILO 9</td></tr><tr><td>CLO 1</td><td>✓</td><td></td></tr><tr><td>CLO 2</td><td></td><td>✓</td></tr></table>
Content	:	1. Installing Python, Editor, and Virtual Environment 2. Jupyter Lab and Google Colab 3. GIT 4. Scientific Computing (Python) 5. Data Science (Python)
Study and examination requirements		Participants are marked based on their performance in theory: Project/Case Study (84%) and Assignments (16%). Students are marked based on their percentage of points obtained and based on the following grade scale: <table><tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr><tr><td>85 – 100</td><td>A</td><td>4.00</td></tr><tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr><tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr><tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr><tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr><tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr><tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr><tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr><tr><td>< 40</td><td>E</td><td>0.00</td></tr></table>
Exams and assessment formats		Assessment in this course combines project-based work and structured assignments. ● **Project-based –** Students demonstrate the creation of simple mathematical programs using Jupyter Lab or Google Colab and publish the results on GitHub. They also develop and present a Python program for scientific computing as part of a larger project. The process spans several weeks with instructor guidance, culminating in both an oral dissemination of results and a written project

		report documenting methodology, code, and scientific outcomes. • **Assignments** – Students demonstrate proficiency in using NumPy and Matplotlib for programming tasks, as well as employing Cartopy and/or PyGMT libraries for plotting and mapping processes. These assignments are designed to reinforce technical skills and ensure students can apply computational tools effectively in geoscientific contexts.
Reading list		Main References: 1. Fuhrer, C., Solem, J.E. and Verdier, O. 2021. Scientific Computing with Python 3: An example-rich, comprehensive guide for all of your Python computational needs. Packt Publishing Ltd. 2. Hill, C. 2020. Learning scientific programming with python 2 nd edition. Cambridge University Press. 3. Lynch, S. 2023. Python for Scientific Computing and Artificial Intelligence. CRC Press. Additional References: 1. Pajankar, A. 2021. Data visualization with NumPy and Matplotlib. In Practical Python Data Visualization (pp.57-79). Apress, Berkeley, CA. 2. Madrinovella, I., Herawati, I., and Abdullah, A. 2020. Buku Ajar Metode Komputasi Geofisika Menggunakan Python. Universitas Pertamina 3. Penuntun Praktikum Pengantar Pemrograman
Last revision date		July 1st, 2025