

**NATIONAL RESEARCH UNIVERSITY  
HIGHER SCHOOL OF ECONOMICS**

Faculty of Computer Science  
Bachelor's Programme "Data Science and Business Analytics"

**Software Project Report**  
on the topic Development of Materials for Teaching Programming in Python  
(interim, the first stage)

**Fulfilled by the Student:**

group #БПАД212\_\_\_\_\_

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## Basic Terms and Definitions

- **Python** - high-level, general-purpose programming language known for its readability and versatility. Python supports multiple programming paradigms, including procedural, object-oriented, and functional programming.
- **Data Type** - a classification which specifies the type of value a variable hold, such as integers, strings, or lists.
- **Function** - a block of reusable code designed to perform a specific task.
- **Library** - a collection of modules that provide implementations for many tasks, such as web programming, date and time manipulation, and mathematical operations. Libraries are used to extend Python's functionality.
- **NumPy** - library for Python, providing support for large, multi-dimensional arrays and matrices, along with a collection of mathematical functions to operate on these arrays.
- **Interactive Learning** - incorporate interactive elements such as coding exercises and projects. This approach encourages active learning and helps students solidify their understanding.
- **Student Guideline** - a set of instructions and rules provided to learners to help navigate their educational course.

## **Introduction**

In the ever-evolving landscape of software development, the ability to program in multiple languages is becoming more and more of a necessity. Python is one of the easiest programming languages to learn given its straightforward approach and versatility.

The project aims to teach students the crucial skills and confidence to tackle software development and data collection and analysis. With plans to engage students through introductory Python programming educational resources and application guides.

This project aims to provide the Python programming language with a set of educational materials which will guide new programmers from their very first steps through to the level of high skills. It also aims to provide a comprehensive set of resources for learners in all phases.

## Plan for Future Work

The plan for further work involves several strategic directions to enhance and expand the educational offerings. This will include the development of a series of step-by-step tutorials in Jupyter Notebooks that allow students to interactively learn Python concepts. These tutorials will include explanations, code samples, and exercises which students can edit and run directly within the notebook.

### **Tasks to be done:**

1. Search for similar courses and carefully learn them and analyze the best techniques for studying. *Deadline: 1 March 2024*
2. Determine key learning outcomes for each theme: NumPy, Strings, Lists. *Deadline: 5 March 2024*
3. **NumPy**: develop educational content for this topic, which would include basic operations, array manipulation and practical applications, in particular:
  - a. array creation
  - b. array attributes
  - c. array indexing
  - d. array slicing
  - e. array mathematics
  - f. aggregation functions
  - g. random number generation
  - h. linear algebra operations
  - i. reshaping
  - j. transposing*Deadline: 15 April 2024*
4. **Strings**: develop educational content for this topic including:
  - a. basic properties
  - b. inner implementation
  - c. slices
  - d. in-built methods
  - e. regular expressions
  - f. encoding and decoding

*Deadline: 25 April 2024*

5. **Lists:** develop educational content for this topic including:

- a. basic properties
- b. inner implementation
- c. slices
- d. in-built methods
- e. multi-dimensional spaces
- f. list as stack and queue
- g. iterations

*Deadline: 15 May 2024*