CONESTOGA

COURSE OUTLINE

Course Programming for Big Data (2023-2024)

Code / Version PROG8421 (100)

Total Hours 84

Credits 6

PreRequisite(s)

CoRequisite(s)

Course Description

Custom applications are often required to collect, transform and present data. In this course, students will review fundamental concepts like language syntax, data types, flow control and modular programming. Students will also use programming languages (like Python, Java and C#), program libraries and visual components to analyze and present information derived from the connected data sources.

PLAR Eligible Yes

Eligible for Supplemental Yes (See eligibility requirements in the program handbook)

Resources

Course Outcomes

Successful completion of this course will enable the student to:

1. Design computer programs from a written problem description using structured design methodology.
2. Use variables using built-in data types in Python.
3. Use operators to manipulate variables.
4. Use flow control programming language constructs, including decisions, and loops.
5. Use existing functions.
6. Create programmer-defined functions and classes.
7. Use programmer-defined data structures.
8. Use file manipulation.
9. Use common programming practices.
10. Individually and as a group, use professional, industry-based techniques to complete work according to requirements.
11. Use regular expressions for pattern recognition.
12. Demonstrate access to large amount of data in a database.
13. Use Python libraries to analyze and represent data.

Unit Outcomes

Successful completion of the following units will enable the student to:

- 1.0 Program Design
  - 1.1 Analyze problems.
  - 1.2 Design computer code from written problems.
  - 1.3 Troubleshoot and debug problems.
- 2.0 Introduction to Python
  - 2.1 Describe the development cycle for Python programmers.
  - 2.2 Install Python.
  - 2.3 Use proper program structure.
  - 2.4 Run programs.
- 3.0 Data Types and Variables
  - 3.1 Dynamically and weakly type.
  - 3.2 Define variables, expressions, and statements.
- 4.0 Operators
  - 4.1 Use arithmetic operators.
  - 4.2 Use logical operators.
- 5.0 Flow Control
  - 5.1 Create conditional statements.
  - 5.2 Create loops and iterations.
- 6.0 Functions
  - 6.1 Use pre-existing functions.
  - 6.2 Create new functions.
  - 6.3 Use parameters and return values.
- 7.0 Data Structures
  - 7.1 Store and manipulate textual data using string variables and functions.
  - 7.2 Open data files and read through the files.
  - 7.3 Store more than one item in a list variable.
  - 7.4 Store multiple values in a dictionary object and look up the values by their key.
  - 7.5 Use simple and efficient data structures like tuples.
- 8.0 Object-Oriented Programming
  - 8.1 Manage larger programs
  - 8.2 Use objects and classes
  - 8.3 Discuss the object lifecycle
  - 8.4 Building classes using inheritance
- 9.0 Access Web Data
  - 9.1 Search for patterns in strings using the regular expression
  - 9.2 Send and retrieve data over HTTP.
  - 9.3 Access data available in a different server using web services.
  - 9.4 Access large amounts of data using databases.
- 10.0 Data Science
  - 10.1 Recognize the meaning of the term "Data Science"
  - 10.2 Use lambdas, list comprehensions and the numpy library.
  - 10.3 Create Series and DataFrame Data Structures
  - 10.4 Use pandas math functions.
  - 10.5 Employ the pandas library to import and manipulate data.
  - 10.6 Learn and apply different data representation techniques.
  - 10.7 Learn and apply Python tools for machine learning.
  - 10.8 Use simple programs in R.

Evaluation

The minimum passing grade for this course is 60 (C).
In order to successfully complete this course, the student is required to meet the following evaluation criteria:

Description	Quantity	Percentage
1. Quiz(zes)	5	25.00 %
2. Project(s)	1	25.00 %
3. Assignment(s)	10	50.00 %
		100.00 %

Web-based Tools

This course may be using web-based services with data centres outside of Canada. Students may be expected to complete assessments where information is transmitted outside of Canada. Students who do not wish to submit their information to other countries have the right to opt-out. It is the responsibility of the student to notify the instructor in the first week of term if they have any concerns. The alternative may require the student to attend the campus testing centre at a designated time.

Notes

Software to Detect Academic Offences: Software may be used to screen assignments or invigilate exams in this course. It is the responsibility of the professor to notify students of any such technologies in advance of their use. It is the responsibility of the student to notify the professor if they, at the time assignment details are provided, wish to opt-out and be provided with an alternate process.
Academic integrity is expected and required of all Conestoga students. It is a student's responsibility to maintain compliance with Conestoga's Academic Integrity Policy at all times.
Conestoga College is committed to providing academic accommodations for students with documented disabilities.
An Instructional Plan will be available at the beginning of the course and will be referred to in conjunction with this course outline.

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