Ministério da Educação
Instituto Federal do Espírito Santo
Campus Vitória

Course: **Programa de Pós-Graduação em Tecnologias Sustentáveis (Mestrado profissional)**	
Module: **Multidisciplinary Artificial Intelligence**	
Instructor: Douglas Almonfrey	
Semester: 2º	Total Hours: **45 h**

OBJECTIVES

General:

- To achieve a preliminary knowledge in order to became a citizen data scientist.

Specifics:

- To understand basic concepts related to Artificial Intelligence, no-code, low-code, and programming tools.
- To discuss concepts and applications of machine learning and deep learning across various fields.
- To relate Artificial Intelligence to your field of research.
- To perform exploratory data analysis.
- To implement no-code and low-code solutions for training and applying models in different use cases.
- To review evaluation metrics in order to interpret the output of Artificial Intelligence solutions.
- To improve your English while learning technical content.

SYLLABUS

English as a Medium of Instruction. Introduction to Programming. Basic Concepts of Python. Artificial Intelligence Terminology. Exploratory Data Analysis. Artificial Intelligence Concepts. Artificial Intelligence Applications.

PREREQUISITE

None.

CONTEÚDOS	**CARGA HORÁRIA**
UNIT I: Introduction 1.1. What is English as a Medium of Instruction? 1.2. What is Multidisciplinary Artificial Intelligence?	3
UNIT II: Introduction to Programming 2.1. How is Information Stored and Processed in Computers? 2.2. What are programming languages? 2.3. Phases of software development. 2.4. Google Collaboratory (Colab). 2.5. Code Versioning and Github.	3

2.6 Practical Activity.	
UNIT III: Basic Concepts of Python 3.1. Data types, variables, and data structures. 3.2. Expressions, commands, and functions. 3.3. Classes and objects. 3.4. Files. 3.5. Programming good practices. 3.6. Practical Activity.	6
UNIT IV: Exploratory Data Analysis 4.1. Data Collection. 4.2. Data Preprocessing. 4.3. Data Analysis. 4.4. Data Transformation and Feature Selection. 4.5. Data Visualization. 4.5. Practical Activity.	3
UNIT V: Artificial Intelligence Concepts 5.1. Introduction to Artificial Intelligence and Basic Terminology. 5.2. Types of Machine Learning. 5.3. Machine Learning Models. 5.4. Machine Learning Pipeline. 5.5. Practical Activity.	3
UNIT VI: Artificial Intelligence Applications 6.1. Linear Regression – Resale Price Prediction. 6.2. Logistic Regression – Fraud Detection. 6.3. Tabular Data Classification – Term Deposit. 6.4. Image Classification – Object Recognition. 6.5. Object Detection – Image-Based Localization and Classification.	27
Total	**45**

METHODOLOGY

These are the learning strategies, techniques, and practices that guide pedagogical activities in the classroom :

- Interactive lectures.
- Practical activities.
- Individual and group study, including analysis of texts and videos.
- Group discussion.
- Quizzes and questionnaires.
- Use of case studies.

RESOURCES

Textbook; class notes, classroom; whiteboard and marker; computer; multimedia projector; scientific articles.

ASSESSMENT OF LEARNING	
Criteria Student production will be prioritized, especially the articulation between the knowledge studied and the solution of real-world problems. Punctuality and attendance in class will also be considered. Observation of both individual and group performance will be conducted to assess whether the student/team was able to develop the required skills and competencies: working in teams; leadership; debating; interacting; proposing solutions; focusing; problem-solving; presenting; and project development.	**Instruments** – Individual summative and formative assessment. – Practical Activities. – Group works. – Seminars.

BIBLIOGRAPHY

Stripling, G. & Abel, M. *Low-Code AI: A Practical Project-Driven Introduction to Machine Learning*. Sebastopol: O'Reilly Media, 2023.

Agrawal, A. *No-Code Artificial Intelligence: The New Way to Build AI-Powered Applications*. Nova Délhi: BPB Publications, 2023.

COMPLEMENTARY BIBLIOGRAPHY

Patrishkoff, D.; Hoyt, R.E. *No-Code Data Science: Mastering Advanced Analytics, Machine Learning, and Artificial Intelligence*. Morrisville: Lulu Press, 2023.

Géron, A. *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 3rd Edition: Concepts, Tools, and Techniques to Build Intelligent Systems*. Sebastopol: O'Reilly Media, 2022.