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**O3 - Distance learning curricula in Machine Learning**

**E-book**

October 2022

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**CODEIN**

Cloud cOmputing for Digital Education INnovation

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**Identification Sheet**

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| **Keywords** | Distance Learning, Machine Learning, Cloud Computing |
| **Abstract** | The CODEIN project published an e-book in English (as a part of IO3) featuring learning materials and teaching methodology for distance learning. It is structured into various annexes that cover an array of educational resources, methodologies, and practical guides aimed at both educators and students navigating the complexities of distance learning. This document serves as a detailed description of the annexes, each dedicated to specific aspects of the curricula, methodologies, and tools required for effective distance learning, ensuring a comprehensive and engaging educational experience. |

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## Introduction

For the purpose of ensuring the transferability of the CodeIn project results, we have prepared this e-book, which includes all the teaching materials with developed methodology for distance learning in the areas of cloud computing and machine learning. We have divided this e-book into multiple sections that include developed teaching materials and curriculums for machine learning and cloud computing. We have also included specific sections related to the use of the applied platform for e-learning and additional cheat sheets from the field of descriptive statistics, which may be useful if you are a beginner in the technologies to which the developed curriculums relate. Below, you can find an additional description of individual parts of the e-book. We hope you successfully apply the developed teaching materials with your students.

## Annex description

### Annex 1 - Methodology for distance teaching and learning

This section provides detailed information on the EBL (enquiry-based learning) methodology that we utilized in our distance learning programs for machine learning and cloud computing. The goal of this methodology is to empower students in their learning process and address some of the potential issues of distance learning. EBL is the foundation of this approach, which aims to equip students with comprehensive knowledge while making the learning experience more engaging. The focus is on developing "powerful knowledge" through authentic research-based learning, enabling students to handle the unknown and serve a specific social purpose through an epistemic approach. Moreover, the significance of connecting research with teaching in remote learning is emphasized, giving students an insight into how knowledge gaps are bridged, new knowledge is generated, and how such knowledge can be put to use in solving real-world problems.

### Annex 2 - Oracle Academy Member Hub learner guide

The primary purpose of this guide is to assist teachers in using the Oracle Academy (OA) Member Hub as a distance learning platform. It aims to promote independent learning and exploration through interactive and engaging educational materials. The document provides a detailed process for enrolling, tracking progress, and accessing additional resources, ensuring a comprehensive educational experience for both instructors and students. You may find instructions for navigating the OA Member Hub environment, using reference materials, information on learning pathways, creating a student transcript report, generating a certificate of completion, and accessing the OA Career Center.

### Annex 3 - Cloud Computing - curicula description

This annex provides a detailed description of the learning objectives for cloud computing based on the EQF methodology at EQF level 6. It lists the teaching units that contribute to the achievement of the intended learning outcomes. The document also presents the feedback obtained from industry partners (employers) through a survey, regarding the relevance and necessity of different curriculum components in the context of technological and labor market trends.

### Annex 4 - Machine Learning - curicula description

This anne contains a detailed description of the learning objectives in the field of machine learning according to the EQF methodology at EQF level 6. The teaching units that contribute to the achievement of the intended learning outcomes are listed. Additionally, the document contains the results of a survey conducted among industry partners (employers) to gather feedback on the relevance and necessity of the various curriculum components in the context of technological and labor market trends.

### Annex 5 - Distance learning curricula in Cloud Computing – handouts with notes

These handouts with detailed notes provide teaching materials for students in cloud computing.

### Annex 6 - Distance learning curricula in Cloud Computing - textbook

We have prepared a textbook titled "*Practical SQL for Oracle Cloud*" in this annex. This book is the outcome of two Erasmus KA2 projects: CodeIn and Bee with APEX. The book aims to serve as a practical guide for students and professionals who want to learn about designing and implementing information systems using Oracle Cloud and SQL. The book underlines the significance of databases and cloud technology, and it includes practical exercises, theoretical overviews, and examples to facilitate effective learning. You can use the Free Tier and Always Free options to access learning resources without any additional expenses.

### Annex 7 - Distance learning curricula in Cloud Computing – assessments

This document contains questions and answers to assess students' knowledge of cloud computing. It is designed for self-study purposes, allowing students to evaluate their understanding and improve their skills. The materials are interactive and available for knowledge assessment on the project's Oracle Member Hub platform. Additionally, a more extensive set of questions and answers can be found here, which can be uploaded to the widely used Moodle LMS open-source platform.

### Annex 8 - Distance learning curricula in Machine Learning - introduction

As we were testing teaching materials on the control student group, we noticed that most of the students lacked knowledge of descriptive statistics. This is a crucial skill required for analyzing and interpreting data, which is a fundamental aspect of machine learning. Therefore, we have prepared this introductory text to help students build a foundation in descriptive statistics before they start learning the machine learning curriculum.

### Annex 9 - Distance learning curricula in Machine Learning – handouts with notes

These handouts with detailed notes provide teaching materials for students in machine learning.

### Annex 10 - Distance learning curricula in Machine Learning – assessments

This document is a compilation of assessments that contain questions and answers designed for testing machine learning knowledge. It is intended for students and practitioners who are interested in self-study and testing. The materials are available for interactive knowledge verification on the project's Oracle Member Hub platform. Additionally, you can also find a broader range of questions and answers that can be uploaded to the Moodle LMS open-source platform, which is the most widely used e-learning system globally.

### Annex 11 - Distance learning curricula in Machine Learning - additonal resources

When involving your students in a research-based learning process, it is important to provide them with additional materials that go beyond what is already covered in the curriculum. To meet this need, our team of researchers has thoroughly searched for the most reliable editions that are readily available for online downloads under a Creative Commons (CC) license. In this annex, you will find a list of 30 such editions, along with their respective download links.

## References

1. Cloud cOmputing for Digital Education INnovation, Accessed: 18.09.2022. [Online]. Available: <https://code-in.org>