Machine Learning Skills Certificate supplement

1. TITLE OF THE CERTIFICATE [1]

Example: MACHINE LEARNING ENGINEER (EN)

2. TRANSLATED TITLE OF THE CERTIFICATE [2]

Example: ΜΗΧΑΝΙΚΟΣ ΜΗΧΑΝΙΚΗΣ ΜΑΘΗΣΗΣ (EL)

3. PROFILE OF SKILLS AND COMPETENCES

Individual Units

- Learning Unit 1: ML essentials for ICT professionals
  - L1.1: Introduction to ML
  - L1.2: Where to apply ML
  - L1.3: Machine learning and Data processing.
  - L1.4: Example ML applications
- Learning Unit 2: Mathematical Foundations
  - L2.1: Set, Functions, Relations
  - L2.2: Linear Algebra
  - L2.3: Probability Theory
  - L2.4: Statistics
  - L2.5: Computation theory
- Learning unit 3: ML Algorithms, Programs, and Protocols
  - L3.1: Machine Learning by linear models
  - L3.2: Supervised learning
  - L3.3: Unsupervised learning
  - L3.4: Semi-supervised learning
  - L3.5: Programming languages and frameworks for ML algorithms
  - L3.6: Best practices for ML
- Learning unit 4: Deep Learning
  - L4.1: Multilayer Perception (MLP)
  - L4.2: Convolutional Neural Networks (CNN)
  - L4.3: Recurrent Neural Networks (RNN)
  - L4.4: AutoEncoders (AE), Restricted Boltzmann Machines (RBM)
- Learning unit 5: Communicating the merits, challenges, and implications of Machine Learning

[1] In the original language. | [2] If applicable. This translation has no legal status. | [3] If applicable.

- L5.1: Introduction to communication and ML involvement
- L5.2: Types, levels, components of effective communication and ways for using Machine Learning in Communications
- L5.3: The future of communication in accordance with Artificial Intelligence
- L5.4: The effects of Artificial Intelligence on communication

- Learning unit 6: Legislation, Ethics, Project Management related to ML
  - L6.1: EU guidelines on ethics in Artificial Intelligence
  - L6.2: Data Value/Costs Model
  - L6.3: Bias in Machine Learning
  - L6.4: Software engineering for AI applications

Learning Outcomes

The holder of this certificate will be able to demonstrate the following knowledge, skills and competences:

- Know ML characteristics and different algorithms.
- Understand the concept behind ML and how to detect patterns from data.
- Identify different types of applications that use the ML algorithms.
- Know the mathematical concepts required for writing programs and algorithms for ML and AI
- Use programming languages for the implementation of machine learning algorithms.
- Define foundational machine learning models
- Select suitable ML model for a given problem
- Develop/Implement ML models using programming languages.
- Understand deep neural network architecture.
- Assess the potential of deep learning in different applications such as natural language processing, computer vision, or recommendation systems.
- Understand the EU law and regulations for AI and ML applications.
- Identify different types of bias in AI and their consequences.
- Know the project management requirements and the lifecycle for AI applications.
- Adapt messages to the diverse needs of individuals, groups and contexts
- Differentiate between various approaches of communicating issues
- Select creative and appropriate modalities and technologies to accomplish communicative goals
- Present messages in multiple communication modalities and contexts

4. RANGE OF OCCUPATIONS ACCESSIBLE TO THE HOLDER OF THE CERTIFICATE [3]

251 - Software and applications developers and analysts

- Computer scientist
- Data analyst
- Data quality specialist
- Data scientist
- Digital games developer

252 - Database and network professionals

- Data warehouse designer
- Database administrator
- Database designer
- Database developer
- Database integrator

[1] If applicable.

- Embedded system designer
- Enterprise architect
- Green ICT consultant
- ICT auditor manager
- ICT business analysis manager
- ICT business analyst
- ICT consultant
- ICT disaster recovery analyst
- ICT intelligent systems designer
- ICT quality assurance manager
- ICT research consultant
- ICT system analyst
- ICT system architect
- ICT system developer
- ICT system integration consultant
- ICT test analyst
- integration engineer
- IT auditor
- Search engine optimisation expert
- Software tester
- User experience analyst
- User interface designer
- Web content manager
- Web developer
- ICT capacity planner
- ICT network architect
- ICT network engineer
- ICT system administrator

5. OFFICIAL BASIS OF THE CERTIFICATE

Body awarding the certificate

Example:

IEK AKMI
16, Kodrigktonos str., Athina 112 57
https://iek-akmi.edu.gr/

Authority providing accreditation / recognition of the certificate

France: Commission nationale de la certification professionnelle
14 avenue Duquesne, 75350 Paris 07 SP
http://www.cncp.gouv.fr

Italy: Ministero dell'Istruzione, dell'Università e della Ricerca
Viale Trastevere, 76 / a - 00153 ROME
www.istruzione.it

Romania: Autoritatea Națională pentru Calificări
Piața Valter Mărăcineanu, București 030167, Romania
http://www.anc.edu.ro/

Germany: Industrie- und Handelskammer zu Berlin
Fasanenstrasse 85,10623 Berlin
www.ihk-berlin.de

[1] If applicable.

Greece: National Organization for the Certification of Qualifications and Vocational Guidance (EOPPEP) Ethnikis Antistaseos 41, Nea Ionia, 142 34 Athens-Greece.
https://www.eoppep.gr/index.php/el/

Level of the certificate (national or European) [1]

Level 5 in the European Qualifications Framework

Grading scale / Pass requirements

Written Assignments Examination

Excellent: 92-100 points

Very good: 91-81 points

Good (Fair): 67-80 points

Satisfactory: 50-66 points

Poor: 30-49 points

Fail: 0-29 points

Pass rate: ≥ 50 points

Access to next level of education / training [1]

Access to continuing and further VET

International agreements

n/a

Legal basis

France: Exemple: Arrêté du 14 juin 2006 publié au Journal Officiel du 23 juin 2006 portant enregistrement au répertoire national des certifications professionnelles. Enregistrement pour cinq ans, avec effet au 23 juin 2006, jusqu'au 23 juin 2011.

Italy: Decreto del Presidente della Repubblica 15 marzo 2010, n. 88 recante norme concernenti il riordino degli istituti tecnici ai sensi dell'articolo 64, comma 4, del decreto legge 25 giugno 2008, n. 112, convertito dalla legge 6 agosto 2008, n. 133

Romania: Ordonanţa Guvernului nr. 129/2000 privind formarea profesională a adulţilor, republicată cu modificările şi completările ulterioare şi actele subsecvente.

Germany: Beispiel: Verordnung über die Berufsausbildung im Bereich der Informations- und Telekommunikationstechnik vom 10.07.1997 (BGBl. I S. 1741) sowie Rahmenlehrplan für die Berufsschule - Beschluss der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (KMK) vom 25.04.1997 (BAnz. AT 08.04.1998 68a) Änderungsverordnung vom 28.05.2018 (BGBl. I S. 654).

Greece: Νόμος 2009/1992 περί Εθνικού Συστήματος Επαγγελματικής Εκπαίδευσης και Κατάρτισης.

[1] If applicable.

6. OFFICIALLY RECOGNISED WAYS OF ACQUIRING THE CERTIFICATE

Description of vocational education and training	Percentage of total programme (%)	Duration (hours/weeks/months/years)
Classroom based	100 %	506 hours of guided learning
Distance learning	100 %	506 hours of guided learning
On-the-job continuing training	100 %	506 hours of guided learning

7. ADDITIONAL INFORMATION

Entry requirements [1]

There are no specific entry requirements or prior knowledge on Machine Learning or Artificial Intelligence. Candidates are expected to have at least a basic ICT background, and appropriate knowledge of Python programming language.

More information (including a description of the national qualifications system)

- France: www.cncp.gouv.fr
- Italy: www.anpal.gov.it/europa/europass
- Romania: www.tvet.ro, www.edu.ro
- Germany: berufenet.arbeitsagentur.de
- Greece: http://www.ngf.gov.gr | https://proson.eoppep.gr/en

National Europass Centres

- France: www.agence-erasmus.fr/page/europass
- Italy: www.anpal.gov.it/europa/europass
- Romania: europass.anc.edu.ro
- Germany: www.europass-info.de
- Greece: https://europass.eoppep.gr/

[1] If applicable.