AI ADVANCED

Background knowledge in informatics or mathematics is required.
Target group: MINT teachers and secondary school students (e.g. technical high school) with some background and a lot of interest in the field but also apprentice and re-train people who are already in daily business.
The objective is to create elite, highly educated graduates in this subject. The goal is to enable people to **understand technology** and **implement applications**.

The graduate of the **AI Advanced** training…

1. Is familiar with different AI areas and frameworks and is aware of ethical, social and legal implications of AI systems.

   - I can understand technical, social, economic ethical and legal implications of the application of AI on a broader basis.
     - Ethics and technological impact and risk assessment,

   - I am able to describe the different AI areas and their fundamental challenges and questions behind.
     - Natural Language Processing – the ability of computers to communicate with people in natural language.
       - Speech/voice recognition and natural language processing: how to process speech (auditory input) and language
     - Computer Vision: how to process visual input; the analyzing of images to find features of the images; object recognition
     - Machine Learning
     - Big Data
     - Knowledge based systems – Systems that contain a ‘database’ of knowledge and can help in finding information, making decisions and planning.
       - Knowledge Representation and Reasoning: how to represent the world and reason about it efficiently
     - Planning
     - Common sense knowledge

   - I am aware of the most common frameworks in those AI areas

2. Masters the required mathematical basics and is able to understand and describe basic AI concepts.

   - I am aware of the fundamental mathematical concepts and I am able to solve specific tasks by using those concepts.
     - Probability/statistics (Bayesian network/graphical model, neural nets)
     - Calculus (derivatives for gradients)
     - Basic Algorithms (complexity comparison)
     - Logic (both first order and propositional)
     - Computer science (relations, programming, databases, etc.)
- Study of algorithms (completeness, optimality, etc.)
- Discrete mathematics
- Linear algebra (vector, matrices, multidimensional spaces, solving equations, etc.): e.g. for supervised/unsupervised learning, …

3. I can describe the basic AI concepts and I am able to solve certain tasks by using those concepts.
   - problem solving by search (discrete mathematics, completeness, optimality, …)
   - logic and reasoning (logic)
   - data driven (statistic)
   - artificial neural networks

3. Is able to describe problems, which require an AI-related solution, in a formal way, and furthermore, is able to efficiently solve those problems by applying adequate algorithms.

4. I am able to analyze and understand a problem.
4. I am able to select appropriate representations for the problem.
4. I am able to use this representation to represent the problem.
4. I can solve the problem by applying an adequate algorithm.

4. Knows the fundamental properties of problems, representations and algorithms.

   - I know the fundamental properties of representations and algorithms.
     - runtime, memory, completeness, correctness
   - I can derive the properties of a given problem.
     - complexity, predictability

5. Is able to analyze, configure, maintain and integrate an existing AI tool and is able to systematically design and practically implement an AI system for a given application.

   - I can understand and apply AI tools which already exist.
     - e.g. applying AI libraries, frameworks, combining technologies,…
   - I can extend already existing tools
     - e.g. road traffic regulation for autonomous cars
In addition to the trainees’ competencies, a graduate of the trainer’s training.

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<thead>
<tr>
<th><strong>1) Is able to select and use an adequate teaching method that meets the trainee’s need for instruction</strong></th>
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<tbody>
<tr>
<td>I can name different teaching methods.</td>
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<td>I can apply different teaching methods.</td>
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<td>I can assess different teaching methods</td>
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<th><strong>2) Understands and adopts the learner-centered approach of the program.</strong></th>
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<tbody>
<tr>
<td>I can explain the learner-centered approach.</td>
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<tr>
<td>I can assess the pros and cons of the learner-centered approach.</td>
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<td>I can apply the learner-centered approach.</td>
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<th><strong>3) Is familiar with the assessment criteria of the EDLRIS program.</strong></th>
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<tbody>
<tr>
<td>I can define the assessment criteria of the EDLRIS program</td>
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<td>I can select teaching material that meets the requirements of the assessment of the EDLRIS program.</td>
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<th><strong>4) Is familiar with the online training approach applied in the EDLRIS program</strong></th>
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<td>I can administer the online training courses of the EDLRIS program.</td>
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<td>I can moderate the online training courses of the EDLRIS program.</td>
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