

D4.2 Specific Curriculum



ADVISOR-CONSULTANT EQF 6/7



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Project information

The Artificial Intelligence Skills Alliance (ARISA) fast-tracks the upskilling and reskilling of employees, job seekers, business leaders, and policymakers into AI-related professions to open Europe to new business opportunities. It is a four-year transnational project funded under the EU's Erasmus+ programme. For more information, contact info@aiskills.eu | aiskills.eu

Project Partners



List of abbreviations

AI	Artificial Intelligence
ARISA	Artificial Intelligence Skills Alliance
EQF	European Qualification Framework
EU	European Union

Table of contents

1.	GENERAL INFORMATION	5
2.	DESCRIPTION OF THE STRUCTURE	6
3.	OVERVIEW OF LEARNING UNITS.....	7
4.	DETAILS OF LEARNING UNITS	8
4.1.	FUNDAMENTALS OF AI (AND MACHINE LEARNING)	8
4.2.	DE AI ACT, GOVERNMENT AND REGULATORY ENVIRONMENT (AI ACT, WOO - OPEN GOVERNMENT ACT, ETC.)	10
4.3.	FAIRNESS IN AI (AND MACHINE LEARNING)	12
4.4.	PRIVACY BY DESIGN	14
4.5.	VALUE SENSITIVE DESIGN - DESIGNING AND TAKING INTO ACCOUNT ETHICAL VALUES	17

List of figures

Figure 1: Assessment..... 6

1. General information

Name	Policy Maker AI Advisor-Consultant
EQF level	(EQF 6/7)
Goals	<ul style="list-style-type: none"> - Basic technical knowledge on the functioning of AI systems - Insight into the broader context in which AI systems will be embedded in the public domain - Gain the ability to have a critical conversation about the design and development of AI systems in the public domain - The student investigates, analyses, evaluates and/or identifies the challenges and opportunities of public values, (privacy) legislation, ethical dilemmas that play a role in digital transformation within government services - Student investigates and/or analyses the possibility of using AI models and algorithms (hereinafter referred to as algorithms) with government data. - Student is able to develop new implementations of algorithms for government services, using reliable and transparent methodologies with an emphasis on improving processes, working methods, culture and citizen experience.
Scope	The scope is to introduce public policy makers with the technical basics of AI and about the ethical + legal considerations that arise when implementing AI systems in the public domain. Learning programmes developed in the context of the Minor digital innovations for Society & Government
Entry requirements	<p>No major requirement.</p> <p>Basic knowledge about the functioning of the public domain</p>
Programme learning outcomes (PLOs)	<p>1 - AI fundamentals (EQF 6)</p> <p>2 - AI and policy (EQF 7)</p> <p>2 - AI Strategy (EQF 7)</p> <p>3 - AI implementation (EQF 7)</p> <p>4 - AI Ethics advanced (EQF 7)</p> <p>5 - Impact of AI (EQF 7)</p>

2. Description of the structure

Structure

We start with an introductory week in which students get to know each other and the learning programmes. In the following three weeks students will receive workshops with theoretical fundamentals. The students then choose a project at a government organization in a project market, on which they work with a team three full days a week during the entire learning programme. One day a week all students come together again for in-depth workshops of your choice, exchange of experiences and guidance.

Day structure

Morning: In the morning, we start the day with recognized experts 'masters'. They will take the students on a journey where theory and practice go hand in hand. The students build up their knowledge step by step, while at the same time refining their skills with targeted exercises. It is an interactive session, with room for questions, discussion and active participation. Afterwards students will be given a challenging assignment to work on in groups.

Parallel to Master Class: In addition to the Master class, there is also a Lab for other themes in the morning. An expert is present in the Lab to help you with the required knowledge and skills for the co-maker's assignment.

Afternoon: The afternoon starts with a consultation with your (team) supervisor to coordinate preparation, planning, reflection, collaboration, goals, assessments, reviews and the educational program aimed at the co-maker. This will be followed by work sessions in the afternoon for professional skills, targeted personal development, team building, entrepreneurship, planning, research, vision & mission and how to make an impact.

Assessment

The assessment is based on building an individual and joint portfolio, in which knowledge, skills, processed feedback and interim assessments are presented. These will be assessed in an assessment at the end of the course.

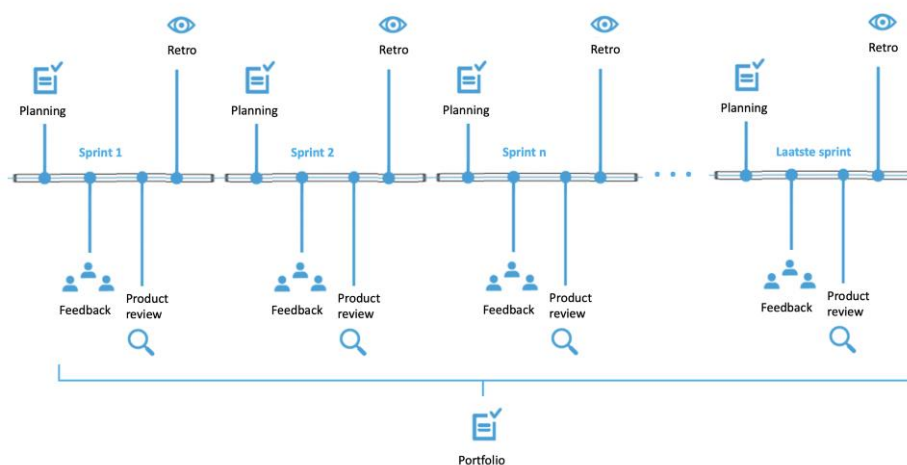


Figure 1: Assessment

3. Overview of Learning Units

Learning unit title	Hours/ECTS	EQF level	Assessment(s)
Fundamentals of AI (and machine learning)	3 days	EQF 6/7	Project portfolio and pitch
De AI, government and regulatory environment (AI act, WOO - Open Government Act, etc.)	1 day	EQF 6/7	Project portfolio and pitch
Fairness in AI	1 day	EQF 6/7	Project portfolio and pitch
Privacy by design	1 day	EQF 6/7	Project portfolio and pitch
Value Sensitive Design – designing and taking into account ethical values	1 day	EQF 6/7	Project portfolio and pitch

4. Details of Learning Units

4.1. Fundamentals of AI (and machine learning)

Description of [learning unit title]

This learning unit takes the participant into various different levels of AI systems. It starts with introducing the basic concepts involved in machine learning and gradually explains more advanced models.

Here the goal is to let the participants understand the functioning of AI systems on a conceptual level and get hands on experience with training their own AI model. By doing so, they gain a better understanding of what they are talking about

Related Programme Learning Outcome(s)

- 1 - AI fundamentals (EQF 6)
- 3 - AI implementation (EQF 7)
- 5 - Impact of AI (EQF 7)

Unit learning outcomes

- Explains common technical terms and concepts (supervised and unsupervised machine learning, generative models, narrow and broad AI).
- Explains common fields of machine learning and AI applications (such as exploratory data analysis, predictive analytics, decision support, computer vision, natural language processing, autonomous systems).
- Explains methods for evaluating the performance and impact of AI models.
- Explains the principles of explainability and interpretability in AI models.
- Explains the need for development and use of foundation models.
- Provides frameworks for integrating AI into organizational strategy.
- Highlights the importance of data quality and data governance in AI projects.
- Explains the lifecycle of AI projects, including data collection, model training, deployment, and maintenance.
- Explains practices, principles, methods, tools, and techniques related to risk management.
- Explains the abilities of AI-based technology and its possible applications to be misused in general, such as privacy violations, algorithmic bias, socio-economic inequalities, misinformation and deep fake technologies, lack of transparency and explainability and social surveillance.

Delivery method(s)

Face to face

This learning unit has 3 sessions which are all divided into two parts

Part 1 = A more in-depth lecture on the theory

Part 2 = A hackathon to implement the theory into practice

The three sessions are structured as follows:

1. Machine Learning 101
2. Machine learning 102
3. Neural Networks

Materials

- Machine learning 101 lecture powerpoint
- Machine learning 101 hackathon code notebook (case + dataset)
- Machine learning 102 lecture powerpoint
- Machine learning 102 hackathon code notebook (case + dataset)
- Neural Networks lecture powerpoint
- Neural Networks hackathon code notebook (case + dataset)

4.2. De AI act, government and regulatory environment (AI act, WOO - Open Government Act, etc.)

Description of [learning unit title]

What are these laws and what do they mean for me?

Related Programme Learning Outcome(s)

- 1 - AI fundamentals (EQF 6)
- 2 - AI and policy (EQF 7)
- 2 - AI Strategy (EQF 7)
- 4 - AI Ethics advanced (EQF 7)
- 5 - Impact of AI (EQF 7)

Unit learning outcomes

- Explains the current regulatory landscape for AI and data privacy laws.
- Lists the main authoritative EU and global publications and sources on AI, such as those of the European Council and the European Commission, the OECD and UNESCO
- Distinguishes current and emerging laws and regulations related to AI, such as the EU AI Act, data protection laws, sectoral regulatory frameworks, intellectual property (IP) laws, anti-trust/competition laws, consumer protection laws, cyber and information security laws.
- Recognises the balance and interaction between regulation and innovation
- Indicates the impact of AI on human rights, economic well-being, and its implications on economic, social, medical, security, and environmental developments.
- Discusses main building blocks and best practices (case studies) of national AI and data strategies
- Recognises the importance of a well-governed, transparent, and structured AI policy development and assessment process.
- Distinguishes current and emerging laws and regulations related to AI, such as the EU AI Act, data protection laws, sectoral regulatory frameworks, intellectual property (IP) laws, anti-trust/competition laws, consumer protection laws, cyber and information security laws.
- Describes the regulatory and policy landscape for AI, including in the EU, e.g. AI Act, and in supra-national bodies like the IEEE and OECD.
- Defines an AI ethics policy.
- Names initiatives, organisations and communities of interest related to AI ethics, such as the OECD AI Policy Observatory.

- Describes the political implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as the potential to affect the democratic process and elections in a negative way, but also improve the policy-making process and the alignment between citizens and politicians.
- Describes the societal implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as facilitating individual services and improving customer satisfaction, but also its ability to undermine as well as to support human autonomy, well-being, and safety.
- Performs an overall AI impact assessment for an AI project or a specific AI application in a certain context by applying an impact assessment model or tool, such as the AI Impact Assessment of the Dutch government, the Microsoft Responsible AI Impact Assessment Guide or OECD's Algorithmic Impact Assessment (AIA)

Delivery method(s)

Face to face

This session has two parts

- The participant will gain insight into the origins of the AI act, how it will be rolled out in the Netherlands and the implications for the use and development of AI systems.
- The participants gain insight into the background and impact of the WOO. The participants can see how the rules impact the implementation of the application

Materials

- Lecture powerpoint
In class exercise (case study where the participants examine it based on the laws)
Hand-out with recourses on where to find information for each law

4.3. Fairness in AI (and Machine learning)

Description of [learning unit title]

Participants gain insight into the ethical considerations when determining 'fairness'. They are introduced to different ways to reduce bias in systems and how a discussion can be held about this

Related Programme Learning Outcome(s)

- 1 - AI fundamentals (EQF 6)
- 4 - AI Ethics advanced (EQF 7)
- 5 - Impact of AI (EQF 7)

Unit learning outcomes

- Describes general concerns, opportunities, risks, and pitfalls commonly associated with AI.
- Explains ethical issues such as fairness, bias, transparency, and accountability raised by AI.
- Provides frameworks for integrating AI into organizational strategy.
- Explains the nature and the field of ethics, its importance and main theories, concepts, and principles.
- Recognises ethical dilemmas.
- Identifies and describes the concepts of bias, trust, fairness, transparency, equality, accountability, and empowerment in the context of artificial intelligence.
- Explains criteria for trustworthy AI, such as lawful, ethical, and robust.
- Explains main recommendations, codes and frameworks related to the ethics of AI, such as the framework for achieving Trustworthy AI of the High-Level Expert Group on Artificial Intelligence and the values-based principles of the OECD.
- Explains methods to implement ethical work practices regarding AI, such as the AI Ethics maturity model.
- Analyses and assesses algorithmic rules against ethical criteria and policy.
- Defines an AI ethical policy.
- Describes the societal implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as facilitating individual services and improving customer satisfaction, but also its ability to undermine as well as to support human autonomy, well-being, and safety.

Delivery method(s)

Face to face

This learning unit is divided into two parts

Part 1 = A more in-depth lecture on the theory

Part 2 = A hackathon to implement the theory into practice

Materials

- Lecture material
- Hackathon code notebook (case + dataset)
- Handout about various types of fairness

4.4. Privacy by design

Description of [learning unit title]

Providing insight into how privacy can be taken into account when developing applications.

Related Programme Learning Outcome(s)

- 1 - AI fundamentals (EQF 6)
- 2 - AI Strategy (EQF 7)
- 3 - AI implementation (EQF 7)
- 4 - AI Ethics advanced (EQF 7)
- 5 - Impact of AI (EQF 7)

Unit learning outcomes

- Describes general concerns, opportunities, risks, and pitfalls commonly associated with AI.
- Explains ethical issues such as fairness, bias, transparency, and accountability raised by AI.
- Provides frameworks for integrating AI into organizational strategy.
- Explains the lifecycle of AI projects, including data collection, model training, deployment, and maintenance.
- Encourages collaboration between technical and non-technical teams.
- Provides guidelines for ethical leadership and decision-making in AI.
- Explains related concepts such as digital transformation and digital strategy and
- Guides the process of identifying customer needs.
- Proposes and evaluates creative ideas on the application of AI technologies, by applying idea generation and evaluation techniques.
- Identifies and prioritizes AI use cases/ scenarios to determine when and what AI solutions are best applicable in a specific situation.
- Provides advice about the possibilities, advantages, and limitations of existing and emerging AI applications in general.
- Explains practices, principles, methods, tools, and techniques related to risk management.
- Performs a risk analysis with identification and assessment of risks of possible AI solutions, considering corporate and societal values and interests.
- Proposes appropriate actions to handle risks and formulates an AI risk management plan, including governance mechanisms.

- Explains methods and techniques to manage change and reach consensus and commitment.
- Determines enabling factors for implementing an AI solution in terms of organisation (e.g., structure, processes, governance), technology (e.g., infrastructure, data), and people (e.g., know-how, roles, functions)
- Explains the nature and the field of ethics, its importance and main theories, concepts, and principles.
- Recognises ethical dilemmas.
- Explains main recommendations, codes and frameworks related to the ethics of AI, such as the framework for achieving Trustworthy AI of the High-Level Expert Group on Artificial Intelligence and the values-based principles of the OECD.
- Explains methods to implement ethical work practices regarding AI, such as the AI Ethics maturity model.
- Analyses and assesses algorithmic rules against ethical criteria and policy.
- Applies technical and non-technical methods to monitor and evaluate the development, deployment and use of the AI system and its learning processes.
- Describes the political implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as the potential to affect the democratic process and elections in a negative way, but also improve the policy-making process and the alignment between citizens and politicians.
- Describes the societal implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as facilitating individual services and improving customer satisfaction, but also its ability to undermine as well as to support human autonomy, well-being, and safety.
- Describes the economic implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as automation-spurred job loss, but also the creation of new jobs, the automation of routine and time-consuming tasks and optimisation of workflows.
- Performs an overall AI impact assessment for an AI project or a specific AI application in a certain context by applying an impact assessment model or tool, such as the AI Impact Assessment of the Dutch government, the Microsoft Responsible AI Impact Assessment Guide or OECD's Algorithmic Impact Assessment (AIA)

Delivery method(s)

Face to face

This learning unit is divided into two parts

- Part 1 = A more in-depth lecture on the theory
- Part 2 = A case study to implement the theory into practice

Materials

- Lecture material
- Hackathon code notebook (case + dataset)
- Handout about various techniques that can be used

4.5. Value Sensitive Design - designing and taking into account ethical values

Description of [learning unit title]

Participants gain insight into how ethical values in technology can be measured and how they can be taken into account when designing a system.

Related Programme Learning Outcome(s)

- 1 - AI fundamentals (EQF 6)
- 2 - AI Strategy (EQF 7)
- 3 - AI implementation (EQF 7)
- 4 - AI Ethics advanced (EQF 7)
- 5 - Impact of AI (EQF 7)

Unit learning outcomes

- Describes general concerns, opportunities, risks, and pitfalls commonly associated with AI.
- Explains ethical issues such as fairness, bias, transparency, and accountability raised by AI.
- Provides frameworks for integrating AI into organizational strategy.
- Explains the lifecycle of AI projects, including data collection, model training, deployment, and maintenance.
- Encourages collaboration between technical and non-technical teams.
- Provides guidelines for ethical leadership and decision-making in AI.
- Explains related concepts such as digital transformation and digital strategy and
- Guides the process of identifying customer needs.
- Proposes and evaluates creative ideas on the application of AI technologies, by applying idea generation and evaluation techniques.
- Explains how AI can be used to create value and be a source of competitive advantage to a business by using structured methods and analysis techniques.
- Identifies and prioritizes AI use cases/ scenarios to determine when and what AI solutions are best applicable in a specific situation.
- Provides advice about the possibilities, advantages, and limitations of existing and emerging AI applications in general.
- Explains practices, principles, methods, tools, and techniques related to risk management.

- Performs a risk analysis with identification and assessment of risks of possible AI solutions, considering corporate and societal values and interests.
- Proposes appropriate actions to handle risks and formulates an AI risk management plan, including governance mechanisms.
- Explains methods and techniques to manage change and reach consensus and commitment.
- Determines enabling factors for implementing an AI solution in terms of organisation (e.g., structure, processes, governance), technology (e.g., infrastructure, data), and people (e.g., know-how, roles, functions)
- Explains the dependence upon data and how to acquire, prepare, manage, and provide and scale data for AI applications.
- Performs a costs and benefits analysis of possible AI solutions.
- Provides advice on appropriate AI solutions based upon benefits, risks, and overall impact for a specific situation.
- Formulates an AI implementation plan.
- Formulates an AI project plan by applying relevant project management methods and tools, e.g., CRISP-DM and agile methodologies.
- Explains the evaluation of AI solutions.
- Communicates and presents advice on an AI implementation in a coherent, clear, convincing, well-argued, and inspiring way
- Describes the essence and key concepts of fundamental human rights and human values.
- Explains the nature and the field of ethics, its importance and main theories, concepts, and principles.
- Recognises ethical dilemmas.
- Explains main recommendations, codes and frameworks related to the ethics of AI, such as the framework for achieving Trustworthy AI of the High-Level Expert Group on Artificial Intelligence and the values-based principles of the OECD.
- Explains methods to implement ethical work practices regarding AI, such as the AI Ethics maturity model.
- Analyses and assesses algorithmic rules against ethical criteria and policy.
- Applies technical and non-technical methods to monitor and evaluate the development, deployment and use of the AI system and its learning processes.
- Defines an AI ethics policy.
- Explains the abilities of AI-based technology and its possible applications to be misused in general, such as privacy violations, algorithmic bias, socio-economic inequalities, misinformation and deep fake technologies, lack of transparency and explainability and social surveillance.

- Explains the abilities of AI-based technology and its possible applications to be used for good in general, such as solving complex problems in fields like climate science, drug discovery and engineering, the amplification of people's abilities e.g. by improving accessibility and self-expression.
- Describes the political implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as the potential to affect the democratic process and elections in a negative way, but also improve the policy-making process and the alignment between citizens and politicians.
- Describes the societal implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as facilitating individual services and improving customer satisfaction, but also its ability to undermine as well as to support human autonomy, well-being, and safety.
- Describes the economic implications of AI by distinguishing the main issues, concerns, advantages, and disadvantages, such as automation-spurred job loss, but also the creation of new jobs, the automation of routine and time-consuming tasks and optimisation of workflows.
- Describes the implications of AI in specific areas, such as the automatization of weapons in defence, algorithmic trading in financial markets, AI-powered recruiting in HR and use of AI-driven robotic devices in healthcare.
- Performs an overall AI impact assessment for an AI project or a specific AI application in a certain context by applying an impact assessment model or tool, such as the AI Impact Assessment of the Dutch government, the Microsoft Responsible AI Impact Assessment Guide or OECD's Algorithmic Impact Assessment (AIA)
- Explains how to perform impact assessments of AI projects or applications from different perspectives, such as a Data Protection Impact Assessment, an Environmental Impact Assessment, a Health Impact Assessment, a Human rights impact assessment, a Racial equity impact assessment and a Gender impact assessment.

Delivery method(s)

- Face to face
- This learning unit is divided into two parts
 - Part 1 = A more in-depth lecture on the theory
 - Part 2 = A case study to implement the theory into practice

Materials

- Lecture material
- Hackathon code notebook (case + dataset)
- Handout about various techniques that can be used



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