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D4.2 Specific Curriculum

DATA SCIENTIST EQF 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

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1. General information

Name	Data Scientist
EQF level	EQF 7
Goals	The Data Scientist curriculum at EQF 7 is designed to enhance participants' expertise in advanced data analysis, machine learning, and AI technologies. It focuses on the development of robust big data infrastructures, sophisticated data analytics, and generative AI models. Participants will gain the ability to manage ML Ops, integrate explainable AI techniques, and apply human-centred design principles to AI solutions. The program also emphasizes ethical data handling, cybersecurity, and effective communication of complex data insights to drive data-driven decision-making and innovation across diverse business contexts.
Scope	This program is intended for individuals with a foundational understanding of data analysis who wish to deepen their expertise in machine learning, AI, and big data technologies.

Entry requirements	• Advanced Mathematics Proficiency:
	  ○ Linear Algebra
	  ○ Probability and Statistics
	  ○ Calculus
	• Programming Skills:
	  ○ Python
	  ○ R
	  ○ SQL
	• Computer Science Fundamentals:
	  ○ Data Structures and Algorithms
	  ○ Software Engineering Principles
	  ○ Database Systems

Programme learning outcomes (PLOs)	1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 3 - ML Ops (EQF 7) 4 - Machine Learning (EQF 7) 5 - Explainable AI (EQF 7) 6 - Big Data & Data Analytics (EQF 7)

	7 - Human-Centered AI (EQF 7) 8 - AI Ethics (EQF 7) 9 - AI Futures and Innovation (EQF 7) 10 - Business Intelligence (EQF 7) 11 - AI Awareness (EQF 6) 12 - Cyber and Data Security (EQF 7) 13 - Generative AI (EQF 7) 14 - Change Management (EQF 6) 15 - Soft Skills (EQF 7)

2. Description of the structure

The course consists of 21 modules totalling 144 hours. It begins with an introduction to AI innovations and machine learning, followed by advanced techniques in ML Ops and deep learning. The curriculum covers practical skills in neural networks, big data infrastructure, and data analytics. It also addresses cybersecurity, generative AI, and the ethical implications of AI technologies. The course concludes with essential soft skills and project management to prepare for real-world data science challenges.

3. Overview of Learning Units

Learning unit title	Hours/ECTS	EQF level	Assessment(s)
Overview of the current AI innovations and their applications	4	EQF 6-7	Exam
Introduction to Machine Learning and Deep Learning	6	EQF 6-7	Exam
State-of-the-Art Machine Learning Techniques and Architectures	8	EQF 7	Exam
Advanced ML Ops and Lifecycle Management	8	EQF 7	Exam
Theoretical and Advanced Deep Neural Networks	8	EQF 7	Exam
Neural Network in Python (TensorFlow, Keras, PyTorch, CNNs, RNNs)	10	EQF 7	Exam and Practical Assignment
Big Data Infrastructure Design (Hadoop, Spark, NoSQL database)	8	EQF 7	Exam and Practical Assignment

Advanced Data Analytics Techniques	6	EQF 7	Exam
Advanced Data Mining Techniques	6	EQF 7	Exam
Machine Learning and AI for Data Management	4	EQF 7	Exam
Fundamentals of Cybersecurity and Data Privacy	6	EQF 7	Exam
Database Security	8	EQF 7	Exam
Introduction to Generative AI	6	EQF 7	Exam
Generative AI applications in our society	4	EQF 6-7	Exam
Implications and potential drawbacks of Generative AI	4	EQF 6-7	Exam
Responsible AI practices for Human-Computer Interaction	8	EQF 6-7	Exam
Introduction and best practices to Explainability in ML	6	EQF 7	Exam
Strategies to manage change in organizations implementing AI	6	EQF 6	Exam
Data Analytics in Business Intelligence	12	EQF 6-7	Exam
Project Management	10	EQF 6-7	Exam
Ethical and legal issues of AI technologies in our society	6	EQF 6-7	Exam

4. Details of Learning Units

4.1. Overview of the current AI innovations and their applications

Description
Introduces recent advancements in AI and their applications.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 9 - AI Futures and Innovation (EQF 7) 11 - AI Awareness (EQF 6)
Unit learning outcomes
• Communicates complex deep learning concepts, methodologies, and outcomes • Assesses the capabilities and limitations of different AI technologies • Critiques the impact of AI technologies on society • Disseminates findings and developments in AI technologies • Assesses the ethical implications of machine learning applications • Assess the emerging trends in AI technology • Lead multidisciplinary teams in experimental AI projects • Evaluate the impact of new AI technologies on existing business models and strategies • Advocate for a proactive approach to AI innovation • Communicate the potential and risks of future AI innovations to a range of stakeholders • Understands the basic concepts and technologies underlying artificial intelligence • Identifies key AI applications in the programming application market • Collaborates with technical and non-technical teams to explore AI opportunities • Knowledge of current trends in AI technology • Engages in continuous learning to keep pace with rapid advancements in AI
Delivery method(s)
• Lectures • Case studies
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:**

Pang-Ning Tan, Michael Steinbach, Vipin Kumar. Introduction to Data Mining. Addison Wesley, ISBN 0-321-32136-7, 2006

4.2. Introduction to Machine Learning and Deep Learning

Description
Covers the basics of machine learning and deep learning techniques.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 9 - AI Futures and Innovation (EQF 7) 11 - AI Awareness (EQF 6)
Unit learning outcomes
• Critically evaluates the theoretical underpinnings of deep learning • Reflects on the ethical, legal, and social implications of deploying deep learning models • Communicates complex deep learning concepts, methodologies, and outcomes • Assesses the capabilities and limitations of different AI technologies • Leads multidisciplinary teams in the design and implementation of machine learning projects • Lead multidisciplinary teams in experimental AI projects • Understands the basic concepts and technologies underlying artificial intelligence
Delivery method(s)
• Workshop • Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Burkov, A. (2019). The hundred-page machine learning book (Vol. 1, p. 32). Quebec City, QC, Canada: Andriy Burkov.

4.3. State-of-the-Art Machine Learning Techniques and Architectures

Description
Explores advanced machine learning methods and model architectures.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 9 - AI Futures and Innovation (EQF 7)
Unit learning outcomes
• Communicates complex deep learning concepts, methodologies, and outcomes • Manages the lifecycle of deep learning projects • Assesses the capabilities and limitations of different AI technologies • Integrates AI technologies to create comprehensive systems that improve decision-making • Innovates with AI technologies to solve novel or unstructured problems • Disseminates findings and developments in AI technologies • Independently develops robust machine learning models using advanced algorithms • Critically evaluates the performance of machine learning models • Integrates machine learning models into existing business processes and systems • Leads multidisciplinary teams in the design and implementation of machine learning projects • Effectively communicates complex machine learning concepts and results • Lead multidisciplinary teams in experimental AI projects
Delivery method(s)
• Lectures • Case studies
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations)

4.4. Advanced ML Ops and Lifecycle Management

Description
Focuses on managing the lifecycle and operations of ML models.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 3 - ML Ops (EQF 7) 9 - AI Futures and Innovation (EQF 7)
Unit learning outcomes
• Applies innovative problem-solving skills • Manages the lifecycle of deep learning projects • Implements AI solutions using best practices in software engineering and data management • Leads strategic planning and execution of AI projects • Designs robust ML Ops architectures • Implements continuous integration and continuous delivery (CI/CD) pipelines • Optimizes machine learning pipelines for performance and efficiency • Evaluates the effectiveness and efficiency of ML Ops systems • Collaborates with data scientists, developers, and IT professionals • Adapts ML Ops practices to emerging technologies and methodologies • Leads cross-functional teams in the development and implementation of ML Ops initiatives • Communicates the strategic value and operational impact of ML Ops to stakeholders • Develop innovative AI applications, utilizing cutting-edge AI technologies • Evaluate the impact of new AI technologies on existing business models and strategies
Delivery method(s)
• Workshop • Lectures • Project Work
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations)

4.5. Theoretical and Advanced Deep Neural Networks

Description
In-depth study of complex deep neural network theories and designs.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Critically evaluates the theoretical underpinnings of deep learning • Designs innovative deep learning models • Communicates complex deep learning concepts, methodologies, and outcomes • Integrates AI technologies to create comprehensive systems that improve decision-making • Innovates with AI technologies to solve novel or unstructured problems • Independently develops robust machine learning models using advanced algorithms • Critically evaluates the performance of machine learning models • Optimizes machine learning algorithms and systems for improved performance • Integrates machine learning models into existing business processes and systems • Applies innovative approaches to extend the capabilities of machine learning • Effectively communicates complex machine learning concepts and results • Cultivates an innovative mindset • Applies critical thinking to evaluate information
Delivery method(s)
• Workshop • Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations)

4.6. Neural Network in Python (TensorFlow, Keras, PyTorch, CNNs, RNNs)

Description
Practical implementation of neural networks using Python frameworks.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 3 – ML Ops (EQF 7) 4 - Machine Learning (EQF 7) 9 - AI Futures and Innovation (EQF 7) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Designs innovative deep learning models • Develops advanced deep learning models using current frameworks and tools • Analyses complex datasets using deep learning models • Collaborates effectively in interdisciplinary teams to design, develop, and deploy deep learning solutions • Applies innovative problem-solving skills • Manages the lifecycle of deep learning projects • Implements AI solutions using best practices in software engineering and data management • Leads strategic planning and execution of AI projects • Optimizes machine learning pipelines for performance and efficiency • Independently develops robust machine learning models using advanced algorithms • Optimizes machine learning algorithms and systems for improved performance • Integrates machine learning models into existing business processes and systems • Applies innovative approaches to extend the capabilities of machine learning • Develop innovative AI applications, utilizing cutting-edge AI technologies • Develops and implements creative problem-solving strategies • Applies critical thinking to evaluate information
Delivery method(s)
• Workshop • Lectures • Project Work
Materials

Lecturer Materials:

Tutorial Materials (Slide and Presentations)

Student readings suggested:

De Marchi, L., & Mitchell, L. (2019). Hands-On Neural Networks: Learn how to build and train your first neural network model using Python. Packt Publishing Ltd.

4.7. Big Data Infrastructure Design (Hadoop, Spark, NoSQL database)

Description
Techniques for designing and managing big data systems.
Related Programme Learning Outcome(s)
6 - Big Data & Data Analytics (EQF 7)
Unit learning outcomes
• Designs and implements robust big data infrastructures
Delivery method(s)
• Workshop • Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Dasgupta, N. (2018). Practical big data analytics: Hands-on techniques to implement enterprise analytics and machine learning using Hadoop, Spark, NoSQL and R. Packt Publishing Ltd.

4.8. Advanced Data Analytics Techniques

Description
Advanced methods for analysing large and complex datasets.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 6 - Big Data & Data Analytics (EQF 7) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Analyses complex datasets using deep learning models • Develops and applies sophisticated data analytics algorithms and models to big data sets • Evaluates the performance of big data systems and analytics approaches • Develops and implements creative problem-solving strategies • Cultivates an innovative mindset
Delivery method(s)
• Workshop • Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Rogel-Salazar, J. (2018). Data science and analytics with Python. Chapman and Hall/CRC.

4.9. Advanced Data Mining Techniques

Description
Techniques for extracting useful patterns and insights from data.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 6 - Big Data & Data Analytics (EQF 7) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Analyses complex datasets using deep learning models • Develops and applies sophisticated data analytics algorithms and models to big data sets • Develops and implements creative problem-solving strategies • Cultivates an innovative mindset
Delivery method(s)
• Workshop • Lectures • Project Work
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Layton, R. (2015). Learning data mining with python. Packt Publishing Ltd.

4.10. Machine Learning and AI for Data Management

Description
Application of ML and AI in effective data management.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 6 - Big Data & Data Analytics (EQF 7)
Unit learning outcomes
• Analyses complex datasets using deep learning models • Implements AI solutions using best practices in software engineering and data management • Develops and applies sophisticated data analytics algorithms and models to big data sets • Manages the entire lifecycle of data analytics projects • Evaluates the performance of big data systems and analytics approaches • Innovates with machine learning and artificial intelligence techniques
Delivery method(s)
• Lectures • Case studies
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Ramakrishnan, R., & Gehrke, J. (2002). Database management systems. McGraw-Hill, Inc.

4.11. Fundamentals of Cybersecurity and Data Privacy

Description
Basic principles of securing data and ensuring privacy.
Related Programme Learning Outcome(s)
12 - Cyber and Data Security (EQF 7)
Unit learning outcomes
• Analyse and mitigate security risks associated with organizational data assets • Design and implement robust security frameworks • Develop policies and procedures that enforce data security standards • Lead cybersecurity incident response teams • Evaluate the effectiveness of security measures • Train and mentor staff on cybersecurity best practices • Stay abreast of the latest developments in cybersecurity technology and threat landscapes • Advocate for ethical considerations in data handling and security practices
Delivery method(s)
• Workshop • Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Thakur, K., & Pathan, A. S. K. (2020). Cybersecurity fundamentals: a real-world perspective. CRC Press.

4.12. Database Security

Description
Approaches for securing databases against various threats.
Related Programme Learning Outcome(s)
12 - Cyber and Data Security (EQF 7) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Analyse and mitigate security risks associated with organizational data assets • Design and implement robust security frameworks • Develop policies and procedures that enforce data security standards • Evaluate the effectiveness of security measures • Train and mentor staff on cybersecurity best practices • Develops and implements creative problem-solving strategies
Delivery method(s)
• Workshop • Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Denning, D. E., & Denning, P. J. (1979). Data security. ACM computing surveys (CSUR), 11(3), 227-249.

4.13. Introduction to Generative AI

Description
Basics of generative AI and its potential applications.
Related Programme Learning Outcome(s)
9 - AI Futures and Innovation (EQF 7) 13 - Generative AI (EQF 7)
Unit learning outcomes
• Advocate for a proactive approach to AI innovation • Design and implement advanced generative AI models • Evaluate the effectiveness and safety of generative AI models • Lead projects and teams in the development of generative AI applications • Communicate the capabilities and limitations of generative AI
Delivery method(s)
• Lectures
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Foster, D. (2022). Generative deep learning. "O'Reilly Media, Inc.".

4.14. Generative AI applications in our society

Description
Practical uses and societal impacts of generative AI.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 7 - Human-Centered AI (EQF 7) 11 – AI Awareness (EQF 6) 13 - Generative AI (EQF 7) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Reflects on the ethical, legal, and social implications of deploying deep learning models • Critiques the impact of AI technologies on society • Assesses the ethical implications of machine learning applications • Critically assesses societal impacts of AI • Identifies key AI applications in the programming application market • Analyses the implications of AI on business processes • Assesses the strategic considerations for integrating AI into business operations • Apply generative AI in novel applications • Communicate the capabilities and limitations of generative AI • Stay abreast of technological advancements in the field of generative AI • Cultivates an innovative mindset
Delivery method(s)
• Lectures • Case studies
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Fui-Hoon Nah, F., Zheng, R., Cai, J., Siau, K., & Chen, L. (2023). Generative AI and ChatGPT: Applications, challenges, and AI-human collaboration. Journal of Information Technology Case and Application Research, 25(3), 277-304.

4.15. Implications and potential drawbacks of Generative AI

Description
Challenges and risks associated with generative AI technologies.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 7 - Human-Centered AI (EQF 7) 9 - AI Futures and Innovation (EQF 7) 11 - AI Awareness (EQF 6) 13 - Generative AI (EQF 7)
Unit learning outcomes
• Reflects on the ethical, legal, and social implications of deploying deep learning models • Critiques the impact of AI technologies on society • Assesses the ethical implications of machine learning applications • Critically assesses societal impacts of AI • Evaluate the impact of new AI technologies on existing business models and strategies • Communicate the potential and risks of future AI innovations to a range of stakeholders • Identifies key AI applications in the programming application market • Analyses the implications of AI on business processes • Assesses the strategic considerations for integrating AI into business operations • Collaborates with technical and non-technical teams to explore AI opportunities • Engages in continuous learning to keep pace with rapid advancements in AI • Communicate the capabilities and limitations of generative AI • Stay abreast of technological advancements in the field of generative AI • Advocate for responsible use of generative AI technologies
Delivery method(s)
• Lectures • Case studies • Group Discussions
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations)

Student readings suggested:

- Barros, A., Prasad, A., & Śliwa, M. (2023). Generative artificial intelligence and academia: Implication for research, teaching and service. Management Learning, 54(5), 597-604.
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. International Journal of Information Management, 71, 102642.

4.16. Responsible AI practices for Human-Computer Interaction

Description
Ensuring ethical AI interactions with a focus on user experience.
Related Programme Learning Outcome(s)
7 - Human-Centered AI (EQF 7) 8 - AI Ethics (EQF 7) 13 - Generative AI (EQF 7)
Unit learning outcomes
• Designs AI solutions that incorporate human-centered design principles • Implements interactive AI systems that facilitate effective human-AI collaboration • Evaluates AI systems from a human-centered perspective • Communicates the benefits and limitations of human-centered AI systems • Critically assesses societal impacts of AI • Analyse the ethical implications of AI systems • Advocate for responsible use of generative AI technologies
Delivery method(s)
• Lectures • Workshop
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations)

4.17. Introduction and best practices to Explainability in ML

Description
Methods to make ML models interpretable and understandable.
Related Programme Learning Outcome(s)
2 - AI Technologies (EQF 7) 5 - Explainable AI (EQF 7) 7 - Human-Centered AI (EQF 7) 9 - AI Futures and Innovation (EQF 7)
Unit learning outcomes
• Innovates with AI technologies to solve novel or unstructured problems • Designs AI systems with a focus on explainability • Implements techniques such as feature importance scores, model-agnostic methods, and visualization of AI decision paths • Evaluates the effectiveness of explainable AI models • Researches and applies the latest advancements in explainable AI • Communicates the importance and benefits of explainable AI to a variety of audiences • Critically assesses AI models for biases and ethical implications • Leads cross-functional teams in projects that require the integration of explainable AI • Advocates for ethical AI practices • Designs AI solutions that incorporate human-centered design principles • Pioneer research and development in AI
Delivery method(s)
• Lectures • Workshop
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Angelov, P. P., Soares, E. A., Jiang, R., Arnold, N. I., & Atkinson, P. M. (2021). Explainable artificial intelligence: an analytical review. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, 11(5), e1424.

4.18. Strategies to manage change in organizations implementing AI

Description
Managing organizational changes due to AI integration.
Related Programme Learning Outcome(s)
14 - Change Management (EQF 6)
Unit learning outcomes
• Understands the principles and theories of change management • Assesses organizational readiness for change • Designs change management strategies • Communicates change effectively, using clear, persuasive messaging • Engages stakeholders throughout the change process • Implements change management plans • Cultivates resilience and adaptability in teams
Delivery method(s)
• Lectures • Case Studies
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Sartori, R., Costantini, A., Ceschi, A., & Tommasi, F. (2018). How do you manage change in organizations? Training, development, innovation, and their relationships. Frontiers in psychology, 9, 320628.

4.19. Data Analytics in Business Intelligence

Description
Applying data analytics to enhance business decision-making.
Related Programme Learning Outcome(s)
2 - AI Technologies (EQF 7) 6 - Big Data & Data Analytics (EQF 7) 9 - AI Futures and Innovation (EQF 7) 10 - Business Intelligence (EQF 7) 11 - AI Awareness (EQF 6) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Integrates AI technologies to create comprehensive systems that improve decision-making • Communicates complex data insights to non-technical audiences • Evaluate the impact of new AI technologies on existing business models and strategies • Develop comprehensive BI strategies that align with organizational goals • Implement BI tools and technologies effectively to collect, store, and analyse data • Lead BI projects • Evaluate the effectiveness of BI systems • Innovate with emerging BI technologies and methodologies • Assesses the strategic considerations for integrating AI into business operations • Develops and implements creative problem-solving strategies
Delivery method(s)
• Lectures • Case Studies
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Berthold, M.R., Borgelt, C., Höppner, F., Klawonn, F. GUIDE TO INTELLIGENT DATA ANALYSIS. Springer Verlag, 1st Edition., 2010. ISBN 978-1-84882-259-7

4.20. Project Management

Description
Skills and techniques for managing AI and data science projects.
Related Programme Learning Outcome(s)
6 - Big Data & Data Analytics (EQF 7) 9 - AI Futures and Innovation (EQF 7) 10 - Business Intelligence (EQF 7) 11 - AI Awareness (EQF 6) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Communicates complex data insights to non-technical audiences • Communicate the potential and risks of future AI innovations to a range of stakeholders • Lead BI projects • Communicate complex data insights to stakeholders at all levels of the organization • Advocate for data-driven culture within the organization • Communicates effectively about AI technologies and their business applications to a range of audiences • Masters advanced communication techniques • Leads and enhances team performance through effective collaboration • Develops and implements creative problem-solving strategies • Delivers compelling presentations, utilizing state-of-the-art presentation tools • Resolves conflicts effectively, using advanced negotiation and mediation skills
Delivery method(s)
• Lectures • Project Work
Materials
Lecturer Materials: Tutorial Materials (Slide and Presentations) **Student readings suggested:** Heerkens, G. (2002). Project management. McGraw-Hill.

4.21. Ethical and legal issues of AI technologies in our society

Description
Ethical and legal considerations in the deployment of AI technologies.
Related Programme Learning Outcome(s)
1 - Deep Learning (EQF 7) 2 - AI Technologies (EQF 7) 4 - Machine Learning (EQF 7) 5 - Explainable AI (EQF 7) 6 - Big Data & Data Analytics (EQF 7) 7 - Human-Centered AI (EQF 7) 8 - AI Ethics (EQF 7) 9 - AI Futures and Innovation (EQF 7) 10 - Business Intelligence (EQF 7) 11 - AI Awareness (EQF 6) 12 - Cyber and Data Security (EQF 7) 14 - Change Management (EQF 6) 15 - Soft Skills (EQF 7)
Unit learning outcomes
• Reflects on the ethical, legal, and social implications of deploying deep learning models • Critiques the impact of AI technologies on society • Assesses the ethical implications of machine learning applications • Critically assesses AI models for biases and ethical implications • Advocates for responsible data usage • Advocates for ethical standards in AI development • Analyse the ethical implications of AI systems • Develop ethical guidelines for AI projects • Evaluate AI systems for ethical compliance • Lead discussions and workshops on AI ethics • Innovate in the creation of tools and methods for ethical AI • Advocate for policies and regulations that encourage ethical AI practices • Advocate for a proactive approach to AI innovation • Integrate diverse knowledge from fields such as cognitive science, engineering, and digital ethics • Ensure ethical considerations in data handling and analysis • Recognizes the ethical, legal, and societal challenges associated with AI deployment • Advocate for ethical considerations in data handling and security practices

- Engages stakeholders throughout the change process
- Applies critical thinking to evaluate information

Delivery method(s)

- Lectures
- Case studies
- Group Discussions

Materials

Lecturer Materials:

Tutorial Materials (Slide and Presentations)

Student readings suggested:

Barocas, S., & Boyd, D. (2017). Engaging the ethics of data science in practice. Communications of the ACM, 60(11), 23-25.

Artificial Intelligence Skills Alliance
www.aiskills.eu
info@aiskills.eu

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