Amsterdam Tech

Professional Masters in Data Science, AI and Leadership

Prepare for the hottest job in the tech age by mastering the skills in data science and AI

The Professional Masters in Data Science, AI and Leadership at a Glance

Programme Title: Professional Masters in Data Science, AI and Leadership
Duration: 19 months
Start Date: November
Education Model: Online
Credits: 60 ECTS
Courseload: 15-20 hrs a week

PROGRAMME DETAILS

Why Data Science?

The immense volumes of data generated since the dawn of the digital age is now taking over the world and changing the way we understand business, people and their behaviours. Organisations from the sciences to healthcare, from finance to the Internet are trying to make sense of the big data originating from a dizzying array of sources and they are on the lookout of skilled people to help lead their business using big data.

According to Glassdoor Job Score determined by three combining factors: number of job openings, salary and overall job satisfaction, Data Scientist is ranked number one with a median base salary of $110,000 and 4,524 job openings in the USA. Harvard Business Review names “data scientist” job as the sexiest job of the 21st century. It also points to a shortage of data scientists becoming a serious constraint.

The Skill Set You Will Acquire

CODING QUALITY

- Demonstrate the ability to write a code that adheres to coding best practices such as functionality, efficiency, ease of understanding, consistent style, clear commenting, and replicability.

DATA UNDERSTANDING and COMMUNICATION

- Create meaningful and aesthetic visualisations to explain data
- Communicate, present and interpret critical data-driven findings and insights to different stakeholders
- Perform Exploratory Data Analysis (EDA) to understand the extent of your data
- Recommend courses of action based on the data findings

STATISTICAL ANALYSIS

- Discover the mathematical foundations and assumptions regression models
- Experiment with regression analysis in counting and binary data via generalised linear models

MACHINE LEARNING

- Discuss the goals and the thinking behind developing and using ML methods
- Demonstrate expertise in the use of supervised ML algorithms using the sklearn package
- Create tree-based methods to develop more powerful and explainable ML models
- Develop unsupervised learning models for clustering and dimensionality reduction
- Distinguish between supervised and unsupervised methods and apply the appropriate algorithm in each problem

- Compare models based on various metrics to assess multiple solutions to each problem
- Implement time-to-event models to model more complicated scenarios
- Re-evaluate a selected model by applying state-of-the-art computational methods on top of the ML algorithms to evaluate and explain the algorithm's predictions, considering the associated cost

DEEP LEARNING

- Interpret the logic behind the mathematical foundations of neural networks and the rationale behind them
- Develop complex neural networks to tackle more complex problems
- Compare complex deep learning architectures with simpler machine learning models

NATURAL LANGUAGE PROCESSING

- Transform NLP data into structured data and apply machine learning models
- Develop state-of-the-art transformers architectures to tackle complex NLP problems
- Justify the outcomes of transformers-based models using explainability algorithms
- Assess the suitability of a data source to be used as training data from a legal perspective

COMPUTER VISION

- Distinguish between the data format of images and standard tabular datasets and understand the need for more complicated methods
- Develop state-of-the-art deep learning architectures to tackle complex NLP problems
- Experiment with different CV architectures on famous datasets like the MNIST dataset

DATA SCIENCE ETHICAL RESPONSIBILITY

- Show the ability to critically evaluate the different ethical responsibilities in data-driven projects
- Identifying biases and limitations in data
- Understand the ownership of the data you are training.

GENERATIVE AI & LLMs

- Load and execute pre-trained transformer-based models from Hugging Face for basic NLP tasks.
- Evaluate the need for advanced language models for more complex tasks in comparison with traditional NLP methods
- Experiment with open-source models, like Llama-3, demonstrating proficiency in loading and fine-tuning the model for specific tasks.
- Integrate RAG techniques with LLMs to improve response relevance in scenarios with limited context.

PERSONAL AWARENESS

- Demonstrate a heightened awareness of themselves as leaders, followers and participants in organisational change.
- Demonstrate the capacity to develop personal reflexivity, presence and informed decision making in a range of organisational and social contexts.
- Engage in reflective practice to continually improve personal leadership effectiveness and have ongoing professional development.

INTERPERSONAL AWARENESS

- Show a developed awareness of group dynamics and how these influence the choice of leadership interventions.
- Pay conscious attention to self, attention to others, active listening, staying present in a range of working environments with a high level of uncertainty.

ORGANISATIONAL AWARENESS

- Demonstrate a broad perspective on the phenomenon of organisation; an understanding of organisations as complex, relational, social processes and the implications of this for the practice of leadership, management and change.
- Articulate an in-depth understanding of major leadership theories, models, and frameworks emphasising contemporary theories of organisation, change and leadership informed by emergent fields of philosophy, psychology, technology and complexity.
- Critically analyse and evaluate own and others' leadership theories and their application to real-world scenarios.
- Increased ability to work with power dynamics while pursuing organisational change.
- Assess and enhance the impact of change initiatives on organisational performance and culture.

COMMUNICATION

- Propose ideas in a clear and concise manner orally, visually and in writing to initiate change or influence context.
- Appropriately adapt message, style, and tone to accommodate a variety of audiences such as peers, specialists, non-specialists, superiors or clients in a professional context.
- Interact with dignity and respect and value the contributions of others.

ETHICAL AND TRUSTED LEADERSHIP

- Provide a critical appreciation of methods and frameworks for the design of leadership interventions and change strategies.
- As a data scientist and practitioner researcher, show the ability to critically evaluate the different ethical and moral responsibilities in data-driven projects and how these are applied and integrated into practical organisational action by you as an accountable member of your learning and professional community.
- Lead and manage organisational change processes, engaging stakeholders effectively.

ACTION RESEARCH SKILLS

- Demonstrate the understanding and integration of forms of qualitative research such as action inquiry, participatory action research, facilitation techniques, action learning and collaborative inquiry to improve the performance of organisations and/or communities.
- Demonstrate developed inquiry skills, questioning, reflecting and learning in developing, changing contexts to accomplish common goals across organisations within changeable and unknown environments.
- Identify the innovative impact that new knowledge acquired through action research can have on one's own work environment and profession.
- Identify the innovative impact that new knowledge acquired through action research can have on the environment beyond the direct stakeholders and decide how this knowledge can be transferred to other domains.

CURRICULUM

Foundational Module 0: Introduction to coding thinking & statistics (Compulsory for those who can't meet the passing criteria in the entry test)

This introductory module is designed for students who do not fully meet the basic entry knowledge level or who would like to refresh their skills. Its aim is to give those without programming/coding experience a gentle introduction to programming thinking. This introduction will give the students the required skills to keep up with the computational and statistical background needed to complete this program.

Certificate 1: Applied Foundations in Data Science and Leadership

Module 1: Welcome and Orientation	**Module 2: Understand and Communicate your Data**
This module introduces students to the programme, facilitators, mentors, and peers. It explores the data science domain, the role of a data scientist, and required tools. Students reflect on their learning journey, set career goals, and learn action learning principles to build effective group dynamics and a strong learning mindset.	This module builds foundational skills to explore, understand, and communicate data effectively. Students learn data structures, relationships, exploratory data analysis, and advanced visualization techniques. Through practical exercises and a project, they gain hands-on experience designing impactful visuals, uncovering insights, and addressing real-world data challenges in decision-making.
Module 3: First Person Inquiry - Self as Leader	**Module 4: Ethical Consideration and Overcoming Biases**
This module explores leadership identity, values, and assumptions. Students learn participatory action research principles, experience community support, and understand organizational limitations. They engage with leadership theory, practice, and philosophies, considering the implications of a post-conventional leadership approach.	This module deepens understanding of ethical challenges in data and AI. Students explore bias, data ethics, and privacy, learning strategies to mitigate issues. They examine AI's ethical implications and governance frameworks ensuring fairness and accountability. A practical project applies these concepts, addressing real-world ethical dilemmas with critical solutions.

Certificate 2: Applied Machine Learning andLeadership

Module 5: Machine Learning (Supervised Learning)	**Module 6: Second Person Inquiry - Relational, Social and Psychological Perspectives in Leadership**
This module explores supervised machine learning for predictive modeling, covering regression, GLMs, tree-based models, and survival analysis. Students learn explainability methods to interpret model predictions and apply non-parametric regression techniques. Through theory and projects, they gain practical skills to tackle real-world predictive modeling challenges with transparency and trust.	This module views organizations as complex, dynamic systems, exploring implications for leadership and alternative intervention approaches. Students deepen self-awareness and relational understanding in professional practice. Through action research cycles, they gather relevant data for workshops and written assignments, enhancing their leadership effectiveness within organizational contexts.

Certificate 3: Advanced AI Technologies and Leadership

Module 7: Machine Learning (Beyond Supervised Learning)	**Module 8: Deep Learning and Applied AI**
This module explores machine learning beyond supervised methods, focusing on unsupervised learning techniques like clustering and dimensionality reduction for uncovering patterns in complex data. Students learn explainability for transparent models, and refine academic writing, equipping them with technical and communication skills for advanced data science.	This module explores deep learning and its AI applications, covering neural networks, CNNs, and RNNs for tasks like image and text analysis. Students gain hands-on experience in NLP and computer vision techniques and participate in a Kaggle competition. Combining theory and projects, this module prepares students for real-world AI challenges.
Module 9: Generative AI and LLMs	**Module 10: Third Person Inquiry - Organisational, Ecological and Contextual Perspectives in Leadership**
This module explores Generative AI and Large Language Models (LLMs), focusing on Hugging Face, transformer architecture, and model training. Students learn LLM capabilities, including text generation, summarization, and question answering. They also study Retrieval-Augmented Generation (RAG) and gain hands-on experience fine-tuning models, preparing to apply generative AI to real-world challenges.	This module integrates leadership, ethics, and the broader context of your work. Students explore transformation, knowledge, and change, focusing on their project inquiries. They consider the nature of change they wish to promote, the ethical implications of their actions, and how these align with their leadership ambitions and future goals.

Final Project (Month 14 – 19)

The final project is the last part of your programme and the successful completion of your professional master. It is a chance for you to put all the competencies you learned - both data science, ai and leadership - into practice. The outcome is intended to be a submission of a work-based project along with **a written report, a recorded presentation** and **a live Q&A session**. The principal question to ask is **“How can I improve my practice?”** With this question in mind, this part of the programme offers a practical and structured way of applying action research in a workplace, organisation or independently.

THE LEARNER EXPERIENCE

Flexible and Innovative

The programme is very flexible and designed to fit the needs of a 21st century student. We offer an interactive part-time learning experience, which means that you are able to study the content at your pace, while still being part of an engaging learner community.

Interactive and Communal

While part of the programme is self-paced, you are part of a community of experts with whom you regularly interact in live workshops, action learning sets, webinars, and other digital sessions. Each cohort is supported by course facilitators, mentors, and community managers to enhance and accelerate their learning experience.

Holistic and Practice-Based

You not only gain the technical skills required on the job market, but also develop the leadership skills and a business mindset that employers appreciate. You will work on weekly assignments and projects, both individually and with peers, so that you gain practical evidence and can showcase evidence of your gained knowledge and skills.

CORNERSTONES OF THE AMSTERDAMTECH LEARNER EXPERIENCE

Workshops: Weekly workshops led by a course facilitator who is a field expert help you define and understand the why, what, how, and what if of the modules. The workshops are a great opportunity to learn by practice and interact with your peers.

Digital Learning Resources: In parallel with weekly workshop topics, you have access to digital resources curated specifically for your programme modules. All content is available within the related week under the modules on Campus. You are also provided a general-purpose e-library (Pluralsight) which is also accessible on Campus.

Action Learning Sets : While some of the learning experience is self-directed, you belong to an action learning set of 4-7 people. Action learning sets take place in between weekly workshops and provide the chance of receiving peer support for a challenge or a problem that you are facing during the programme. You join an action learning set once a week, and it is self-organised. To get you started with the format, you receive several workshops on how to conduct action learning sets on your own.

Mentoring: As part of your action learning experience, you also get to meet your Mentor as a group biweekly. Your mentor is a field expert with extensive experience and knowledge. You interact with your mentor on a regular basis to receive support throughout the programme. Mentors help you gain mastery in your field of study as well as receive tips and guidance towards employability. Please remember that your mentors do not proof-read your assignments or give direct answers to your technical questions.

Assignments & Projects: You work on and solve real-world problems in each assignment and project. You get the chance to put your learning into action and build a portfolio along the way. Every week you are given an assignment while at the end of each module you are given a module project which is more comprehensive and challenging.

Peer-to-Peer Learning: We believe that peer-learning is an important element for success, and we see this as one of the core features of each programme. Some of the assignments and projects are designed in such a way that you work together as peers and develop your teamwork skills as well as learn from one another.

Town Halls: A Town Hall is an online event led by one of our community managers in which we regularly share ideas and feedback - but also create a space to celebrate achievements and share exciting news with one another. Town Halls are generally held bimonthly.

TALENT ACCELERATOR PROGRAMME

Employability is at the core of all AmsterdamTech programmes. We strive to provide you with the best learning environment and a community in which you can acquire transferable skills and develop your professional profile for future employment. We adopt a competency-based learning model, and focus on your mastery of technical skills and leadership skills in our curriculum. The portfolio you build during the foundation course enhances your chances for employability, therefore you are encouraged to build a strong portfolio and make use of the provided career guidance by your mentor.

For those interested in job and traineeship opportunities in the Netherlands, we offer a separate Talent Accelerator Programme. With a shortage of tech talent in the country, there are many different types of organisations who are looking to hire job-ready alent.

What is the Talent Accelerator Programme?

The Talent Accelerator Programme is a set of activities designed to improve your employability. These are additional sessions and services offered outside of the regular course-related content and workshops. The following is an example of what to expect as part of the programme:

- Access to AmsterdamTech Job Portal
- Mentoring and coaching for career purposes, i.e. interview preparation, CV screening
- Employer meet-ups (taking place in Amsterdam or online)
- Hackathon (taking place in Amsterdam or online)

The Talent Accelerator Programme starts once students have finalised the Data Science Certification in our programmes.

Prerequisites for The Accelerator Programme

This programme is invitation only. This means you must be in good standing to join the talent accelerator programme. You should demonstrate mastery in the competencies of the certificate, fulfil your community commitments creating a presence and prove accountability. We measure accountability when there are multiple cases of submitting assignments after the deadline has expired. It might also be important to possess a certain level of previous professional experience.

It is important that we get to know you through presence and participation in the programme. You actively participate in learning accelerators like action learning sets and mentoring as well as community activities like town halls, and are accountable to the greater AmsterdamTech community. First and foremost, we expect you to be an inquisitive learner who is supportive to their peers in the cohort.

Joining the Accelerator Programme cannot guarantee (immediate) placement in a Dutch company.

ADMISSIONS

Who should apply?

You should join this programme if you want to start a new career in data science and AI or upgrade your skills and boost your employability for data science and AI jobs, if you consider working as a free-lance data scientist or want to start your own business.

We evaluate and review each application holistically, and consider your educational background, professional experience, and motivation in your admission decision. While we welcome a diverse group of talent with each cohort, we generally note that those who are most successful in the programme share:

- A bachelor's degree in a computing field or its equivalent in STEM (Science, Technology, Engineering & Mathematics)
- Intermediate knowledge & experience in Statistics and Calculus
- Knowledge and experience of Python programming

You must have the following language proficiency in English. TOEFL Computer-based Internet-based: 234 or 90-91 IELTS 6.5 (minimum 6.0 in each band)

Admission Process

1. **Application:** Fill in the online application form, including an up-to-date resume and a motivation statement.
2. **Selection:** Our academic board will review your application.
   Shortlisted profiles are requested to conduct an online analytical thinking test and interview. You will then be notified about the result of your application.
3. **Enrolment:** Upon acceptance, you are asked to confirm your seat in the cohort by paying the registration fee and signing our Community Guidelines. We also ask you to submit a copy of your academic diplomas and transcripts, passport, and English proficiency test scores.
4. **Entry test for basic programming:** Upon enrolment, you will be required to complete an entry test for basic programming and statistics.
   Those who pass the test will be able to start the programme from Module 1.
   Those who don't pass the test, will be required to complete a Foundational Module before the start of the programme.

TUITION AND PROGRAMME FEES

The total tuition for this programme is 3600 Euros.

We offer two payment models:

1. **Instalments:** Pay in instalments while you study
2. **Deferred Tuition Scheme:** Start at only 99 Euros a month, and pay your tuition when you get a job.

The Deferred Tuition Scheme

With the AmsterdamTech Deferred Tuition Scheme, you are able to defer your tuition up to 5 years - until you get a job.

You can start the programme by paying 99 Euros a month – this is a membership fee that gives you access to all the digital learning content; to the learning accelerators like workshops, mentor support, and action learning; and to all the community channels.

In addition, we require a fee to issue your certifications and diploma:

Data Scientist Certification:	€485
Data Science Master's Diploma:	€985

You are able to defer your tuition for up to 5 years, starting from the time of your enrollment. All you need to do to defer your tuition, is to be and stay a member of the AmsterdamTech community by paying your membership fee and, as desired, taking part in AmsterdamTech community activities. Any membership fee paid after you graduate is deductible from your remaining tuition.

TESTIMONIALS

"AmsterdamTech is bridging the gaps between MOOCs and traditional education. With the Data Science bootcamp, I feel that I am near to a perfect data scientist. We have weekly workshops where we are guided thoroughly by facilitators, we are guided by mentors, and we have weekly assignments and projects so that helps me to build on my skill consistently.

With the Leadership bootcamp, it is not like a traditional project or time management course. AmsterdamTech teaches you about self-leadership, how to be a good coach and consultant, and how you can make a difference in an organisation by knowing yourself better. We students became the consultant to the client and it was very much like you're working in the industry. So the assignments are not just assignments, they are real-time projects where you feel you are there.

I am getting more connected to myself, my studies, and my role as a data scientist."

Trishala Basti, February 2019 Cohort

"After exploring some professional experience in the tech domain, I've figured out Data Science was the right path to pursue. Having gone through various online courses, I was looking for some proper degrees in this domain. That's when I came to know about AmsterdamTech.

Feasibility, facilitator profiles, and the vision to change the learning practice is what attracted me towards AmsterdamTech. Extremely talented instructors, very interactive administrative staff, and frequent interaction with the higher authority of the university never made me regret. The extremely diverse student background made the journey more exciting.

I've learned soft-skills like problem analysis, leadership, team-working, and project management. The learning in the data science field has come handy for me in achieving my career goals. With AmsterdamTech, I find myself a step closer to being a perfect data scientist."

Sarthak Pokharel, February 2019 Cohort

“I chose AmsterdamTech because of flexibility. As a working professional I wanted to upgrade myself with data science skills. At AmsterdamTech, I can continue my job while upskilling myself. We have mentors and facilitators that really help you to be more accountable for your own learning. That helped me to speed up my learning and become a data scientist.

I was amazed by the Leadership Bootcamp. The kind of leadership training given at AmsterdamTech is very unique; I have not seen it in my professional career. The coaching and consultancy skills are specific to what is required in the market. As a data scientist, everyone should have these skills.

The Employer Meetup was very surprising to me. When I came to the meetup, there were more than 30 recruiters and pioneers there. It was very exciting as well as challenging to present our pitch to each of them. I got a chance to network with those who are starting their business in AI, recruiters, and data science pioneers. It was strategic to make a network in my domain.”

Mani Jangde, February 2019 Cohort

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