DATA SCIENCE INSTITUTE

Internationally Accredited Data Science Programme

Postgraduate Diploma in Computer Science (AI and Machine Learning)

Data Science Education and Certification

Postgraduate Diploma in Computer Science (AI and Machine Learning)

Course Overview

The Postgraduate Diploma in Computer Science (Artificial Intelligence and Machine Learning) covers Python programming, foundation models, computer vision, NLP, applied statistics, mathematics for AI, high-dimensional data, deep learning, and MLOps. Blending rigorous theory with practical implementation, it develops advanced technical competencies sought by industries like banking, finance, pharma, technology, retail, and telecoms.

Spanning the AI lifecycle—from conceptualization to deployment—it equips graduates to design, implement, and maintain AI-driven solutions in real-world environments. Students may also progress to the MSc through an Applied Computer Science Project for further specialization and professional growth.

The Postgraduate Diploma in Computer Science (Artificial Intelligence and Machine Learning) will enable you to:

- Develop foundational programming skills in Python and relevant libraries, establishing a strong coding base for AI and ML applications
- Strengthen statistical and mathematical understanding, applying core principles such as linear algebra, probability, and calculus to optimize and interpret algorithms
- Master essential machine learning techniques, from basic regression and tree-based models to advanced methods like boosting and AutoML
- Analyze complex, high-dimensional datasets, employing dimensionality reduction, clustering, and feature selection for large-scale data insights
- Implement deep learning approaches, including neural networks, convolutional architectures, and transformer-based models for vision and language tasks
- Deploy AI solutions in real-world environments, focusing on containerization, MLOps, and model monitoring for professional, large-scale applications
- Complete an applied AI & ML project, integrating end-to-end skills—from data gathering to deployment—and preparing you for industry roles

Who Should Take This Course?

Software Engineers & Technical Leads	Professionals with a development background or strong academic fundamentals who want to integrate advanced AI and ML into existing systems and lead high-impact projects.
Data Analysts & AI Specialists	Experienced analysts or academically qualified individuals seeking to expand their expertise in machine learning, deep learning, and large-scale deployment techniques.
Statisticians & Quantitative Experts	Practitioners who aim to enhance their analytical repertoire with cutting-edge AI algorithms, bolstering model performance and scalability.
Researchers & Academics	Scholars, postgraduate students, or lab professionals interested in applying and extending AI research in areas such as computer vision, natural language processing, or healthcare analytics.
Entrepreneurs & Innovation Managers	Leaders in technology-driven ventures or established organizations who want to harness AI for product innovation, process optimization, and strategic growth.

Entry Requirements

Academic Entry Route

We invite candidates with a strong foundation in numerate or analytical disciplines to join our advanced data science programs. Typically, this includes:

- **A 2.1 honours degree** (or international equivalent) in a numerate/analytical discipline
- Preferred fields such as Mathematics, Statistics, Computer Science, Engineering, Physics, Sciences, Economics, or quantitative Business Studies
- Consideration of alternative qualifications for those demonstrating sufficient quantitative or analytical skills

Alternate Entry Route

Designed for professionals with relevant experience and/or non-degree qualifications, this route offers an opportunity to advance in data science. Candidates must demonstrate:

- **Recognised Prior Learning (RPL):** Minimum of Four years' relevant professional experience
- **Performance-Based Assessment (PBA):** Provisional admission, requiring a GPA of 90% or higher in the first two course modules for full acceptance

How to Apply and further information

Course applications can be submitted on our website at:
https://www.datascienceinstitute.net/postgraduate-diploma-in-computer-science-ai-machine-learning
Along with your application, please submit:

Curriculum Vitae (CV)
Educational Certificates

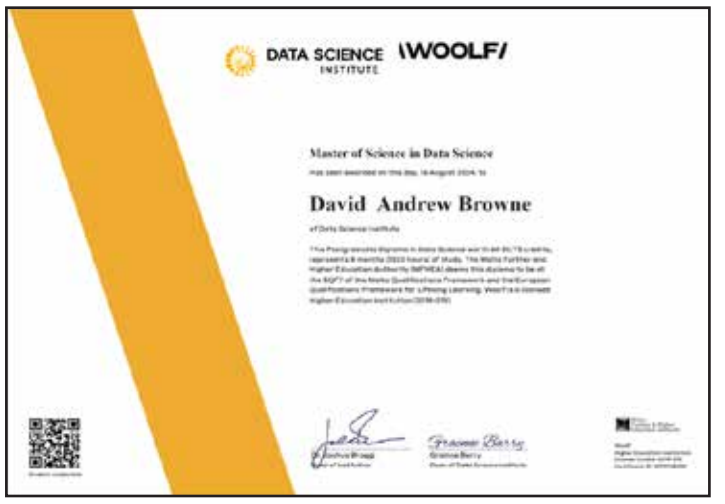
Non-native English speakers must provide evidence of language proficiency equivalent to **IELTS 6.5 or higher.**

For further information:
Phone: +353 21 204 0519
Whatsapp: +353 89 973 5641
Email info@datascienceinstitute.net

Accreditation

The Data Science Institute's postgraduate programmes in Data Science, Machine Learning, and AI are fully accredited by Woolf University in Malta and award internationally recognized ECTS credits. Designed to meet rigorous academic standards, they not only equip you with advanced skills for a competitive job market.

Accreditation and ECTS Credits



Underpinning these programmes is the European Credit Transfer and Accumulation System (ECTS), a standardized framework that assigns one credit for approximately 25–30 hours of student workload. Recognized by universities and employers worldwide, ECTS enhances the portability of your qualification and facilitates further education or professional advancement.

Academic Pathways

Through structured academic pathways, students can progress seamlessly from postgraduate certificates to diplomas and ultimately to a master's degree, securing a credential widely respected by employers and institutions. Woolf accreditation ensures the credibility of your qualification, while ECTS credits offer global transferability and transparency of learning outcomes.

Postgraduate Pathway to MSc in Computer Science

Postgraduate Diploma in Computer Science	MSc in Computer Science
60 ECTS credits	**90 ECTS credits**

Industry-Aligned and Academically Accredited

Industry Focus

At the Data Science Institute, our programmes and certifications blend real-world relevance with rigorous academic standards, ensuring that graduates earn qualifications recognized across sectors. Guided by an active Industry Advisory Board of senior professionals, our curriculum remains on the cutting edge of evolving technologies and workforce needs.

Academically Accredited

At the Data Science Institute, all our programmes and certifications are not only industry-driven but also academically accredited, ensuring that learners gain recognised qualifications that carry value across sectors. Our offerings are co-developed with input from industry experts and aligned with academic standards, so learners benefit from both real-world relevance and rigorous quality assurance.

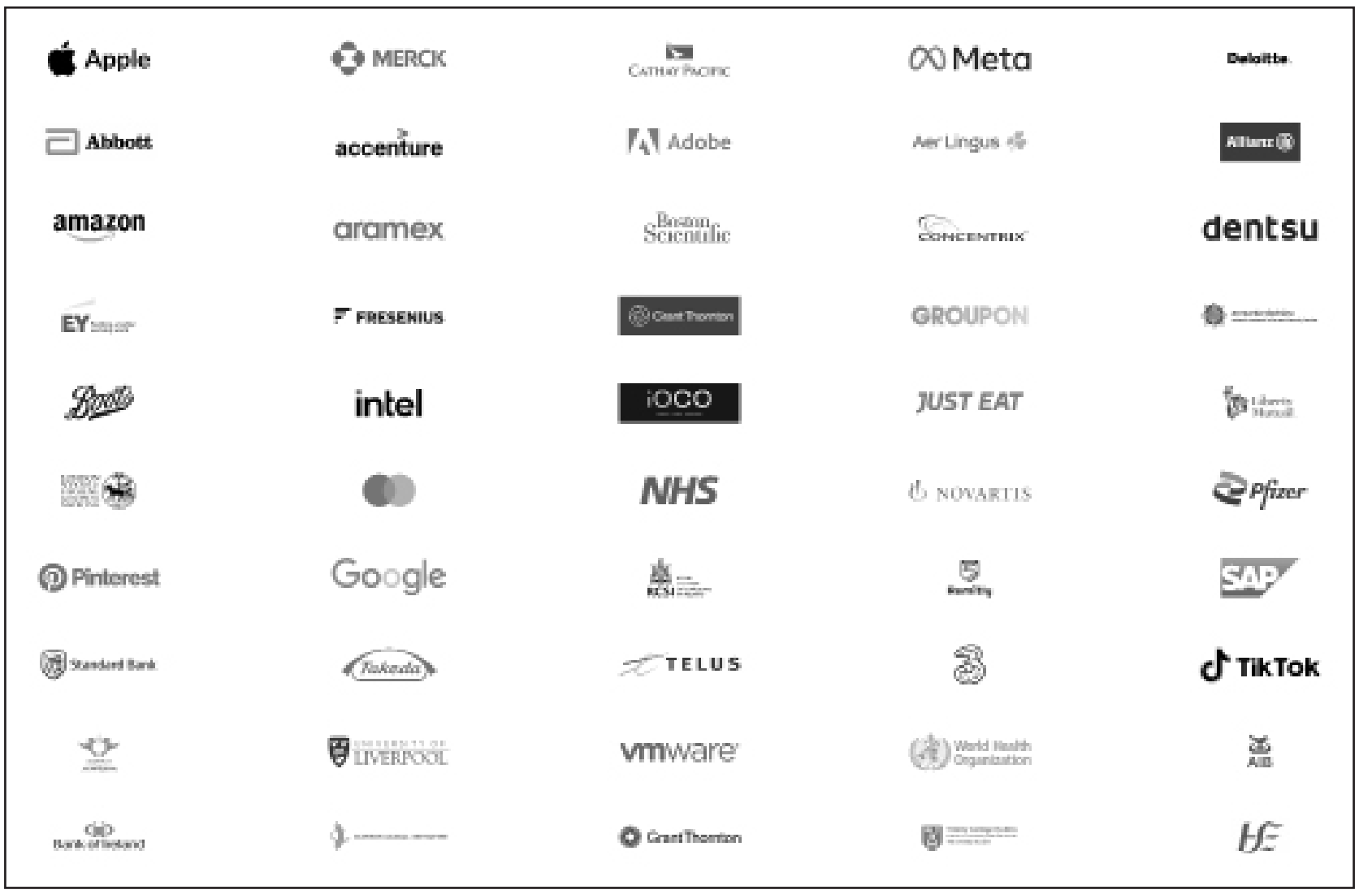
Our Faculty

Our faculty members bring extensive, hands-on experience from diverse fields such as finance, healthcare, manufacturing, and technology. Having worked with leading global organizations, they combine practical insights with academic expertise to deliver an education that is both industry-informed and forward-thinking.

Our Students and Graduates

Our students come from varied professional and academic backgrounds, progressing into roles ranging from Data Scientists and Cybersecurity Specialists to Management Consultants and Researchers. They represent multiple nationalities and work for a wide array of employers, including large corporations, research institutes, and innovative startups. Whether just starting out or making a career pivot, all share a commitment to applying data-driven approaches that create meaningful impact across industries.

Some of the organisations our students and graduates work at



Programme Modules

Module 1: Introduction to Computer Programming

Covers Python essentials (syntax, data types, control structures) to build a coding foundation for AI and ML. Students practice writing, testing, and debugging programs in realistic scenarios, preparing them for data-driven tasks. Emphasis is on skills used in software development, automation, and data-focused roles.

Introduction to Computer Programming

Python Fundamentals
Control Structures
Realistic Debugging
AI/ML Foundation

Module 2: Applied Statistics

Students learn statistical techniques essential for AI and machine learning, including descriptive and inferential methods for analyzing data, designing experiments, and validating hypotheses. This module develops competencies in statistical modeling, probability distributions, and hypothesis testing—fundamental skills for training machine learning models, optimizing algorithms, and ensuring data-driven decision-making in AI applications.

Applied Statistics

Descriptive & Inferential
Probability Distributions
Hypothesis Testing
Experimental Design

Module 3: Mathematics for Computer Science

Introduces linear algebra, calculus, and probability as core mathematical foundations for AI and machine learning. Students apply vectors, matrices, eigenvalues, and Bayes' theorem to optimize models and handle uncertainty. These concepts are essential for developing, optimizing, and interpreting machine learning algorithms, enabling students to build AI models.

Mathematics for Computer Science

Linear Algebra
Probability Theory
Differential Calculus
Matrix Operations

Module 4: Introduction to Machine Learning

Covers core ML methods (linear, logistic regression; decision trees; Random Forest), addressing missing data and class imbalance. Students learn model evaluation to build reliable industry solutions for tasks such as customer segmentation, fraud detection, or operational forecasting.

Introduction to Machine Learning

Regression Techniques
Tree-Based Methods
Missing & Imbalanced
Model Evaluation

Module 5: High Dimensional Data Analysis

Addresses complex datasets via dimensionality reduction (PCA, t-SNE), clustering (K-Means, DBSCAN), and feature selection (Lasso). Students learn to manage large feature spaces—essential in fields like finance, genomics, and text analytics—uncovering insights and streamlining computations.

High Dimensional Data Analysis

Dimensionality Reduction
Feature Selection
Data Visualization
Scalable Processing

Module 6: Advanced Machine Learning

Explores boosting (AdaBoost, XGBoost, LightGBM) and AutoML for efficient model experimentation. Students apply SHAP and LIME for interpretability, aligning AI solutions with ethical considerations and compliance requirements in regulated industries.

Advanced Machine Learning

Boosting Techniques
AutoML Efficiency
Model Interpretability
Ethical Compliance

Module 7: Introduction to Deep Learning

Examines neural network fundamentals (gradient descent, backpropagation) along with feedforward, convolutional, and recurrent architectures. Students learn regularization, hyperparameter tuning, transfer learning, and diffusion models for applications in image analysis, language processing, and beyond.

Introduction to Deep Learning

Neural Networks
Backpropagation Techniques
Activation Functions
Hyperparameter Tuning

Module 8: Deep Learning for Computer Vision

Focuses on convolutional networks for classification, detection, segmentation, and examines vision transformers and diffusion models for generative tasks. Students learn to handle visual data at scale, relevant to sectors like healthcare imaging, security, and autonomous systems.

Deep Learning for Computer Vision

Image Processing
Object Detection
Convolutional Nets
Feature Extraction

Module 9: Deep Learning for Natural Language Processing

Covers deep learning for text: embeddings (Word2Vec, GloVe), recurrent architectures (LSTM, GRU), and transformer-based models (BERT, GPT). Also explores diffusion-based language models and retrieval-augmented generation (RAG) for tasks like sentiment analysis, NER, translation, and conversational AI.

Deep Learning for Natural Language Processing

Neural Networks
Backpropagation Techniques
Activation Functions
Hyperparameter Tuning

Module 10: Productionization of Machine Learning Systems

Focuses on deploying and maintaining ML applications in professional environments. Students use containerization (Docker), API development (FastAPI, Flask), and MLOps practices for continuous integration, monitoring, and iterative improvement of AI solutions.

Productionization of Machine Learning Systems

Continuous Integration
Deployment Pipelines
Version Control
Monitoring Models

Module 11: Applied Computer Science Project (AI & Machine Learning)

This is a 10 ECTS credit, industry-aligned project covering data gathering, model creation, and deployment. Students synthesize skills from prior modules, producing a work-ready portfolio piece that reflects real-world AI challenges and prepares them for end-to-end implementation roles.

Applied Computer Science Project (AI & Machine Learning)

Practical Implementation
Project Design
Research Methodology
Hands-On Experience

Course Delivery

We employ a structured approach that balances theoretical foundations with practical application, ensuring participants gain both the critical knowledge and experiential skills necessary for professional advancement.

Cohort-Based and Supportive Learning Environment

Our cohort-based model enables participants to progress together, fostering mutual support, shared experiences, and peer-to-peer learning. Through collaborative discussions and group problem-solving, this structure enriches both academic growth and real-world preparedness.

Flexibility and Engagment

Our programmes accommodate diverse time commitments, allowing participants to balance scheduled, instructor-led sessions with hands-on, interactive activities. This blend of structured teaching and practical work facilitates a deeper engagement with course materials and methods.

Course Features

Flexible Schedules	Balance live, instructor-led sessions with self-paced content for an adaptable learning experience
Learning Platform	Access recorded live sessions, structured course materials, and supplementary resources at any time.
Discord Channel	Stay connected with peers and instructors through real-time updates, feedback, and collaborative tools.
One-to-One Tutorials	Receive individualized guidance to address specific learning objectives or areas of interest.
Group Projects:	Collaborate on authentic case studies, enhancing teamwork, problem-solving skills, and applied knowledge.
Live Concept Classes and Hands-On Workshops	Participate in synchronous classes led by expert instructors to build foundational and advanced competencies. Reinforce learning through practical coding and modelling exercises that simulate real-world scenarios.

Data Science Institute

The Data Science Institute is dedicated to providing academically accredited education and professional certifications in data analytics, data science, artificial intelligence, and machine learning.

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