

# ARTIFICIAL INTELLIGENCE & CLOUD: HANDS-ON INNOVATION

*2<sup>nd</sup> level Specializing Master*



POLITECNICO  
DI TORINO





## **TODAY'S CHALLENGES NEED A NEW GENERATION OF TALENTED SPECIALISTS**

The opportunities brought by AI and the corporate trend to move business models and core services to the cloud are shaping where, and how, companies do business.

This requires people with the highest and most sophisticated level of training and expertise.



# THE ARTIFICIAL INTELLIGENCE & CLOUD: HANDS-ON INNOVATION MASTER'S DEGREE

This unique year-long programme, developed by Reply and Turin Polytechnic, offers an elite group of talented post-graduates a Master's qualification in some of IT's most advanced specialisations.

This Master's programme, the first of its kind, is scheduled to start in January 2021, and will accept up to 40 students. Taught in English, successful students will divide their time between Turin Polytechnic and [Reply's offices](#).



# WHO IS THE MASTER'S PROGRAMME FOR?

The 12-month programme is for students with a degree (awarded by 31 December, 2020) in one of the following:

*Computer Engineering, Computer Science, Automation Engineering, Telecommunications Engineering or Electronic Engineering.*

Selected candidates will receive a job offer from Reply, valid from the beginning of the Master's. If students stay in their job for at least two years, Reply will cover the cost of taking part in the programme (€ 18.000).

In other words, we pay you to study so you get to earn while you learn.

**#EarnWhileYouLearn**



## **DURATION**

1 Year

From January -  
December 2021

Lectures, labs, real  
projects, seminars,  
thesis.

## **LANGUAGE**

English

Level B2 required

## **PLACES AVAILABLE**

40

The first year is  
limited to 40  
students.

## **COST**

No cost

On accepting a  
permanent employment  
contract, Reply pays the  
Master's fee (€18,000).

## **SPECIALISATIONS**

3 paths

Students choose one from  
three paths:

AI: Data

AI: Machine Learning

Cloud

## **LOCATION**

Turin

Lessons take place on the  
Politecnico di Torino  
campus.

Project work takes place in  
one or more Reply offices.

## **CAREER**

Permanent job

Chosen students receive a  
permanent job offer with a Reply  
Group company.





# THE PROGRAM TIMELINE



During term one, students learn key concepts and theories of AI and cloud. Topics include advanced databases, AI and ML models, and cloud architecture and infrastructure.

During term two, students select one of the three specialisations: Cloud, Data or Machine Learning.

During term three and part of term four, students work on real projects alongside established professionals.

In the final stages of the Master's programme, students write a thesis describing the activities they carried out during the project phase.



# SPECIALISATIONS

The Master's illustrates how to apply modern digital technologies in practice – from effective data management to adopting AI and ML techniques – by using the latest cloud-based implementation models.

The Master's offers three areas of specialization for students to choose from:

1. AI: DATA
2. AI: MACHINE LEARNING
3. CLOUD



# 1. AI: DATA

In this specialisation, students study in depth, the technologies and methodologies that enable the adoption of a data-driven approach.

The Data Engineering point of view:

- The technological origins of big data: Hadoop, MapReduce, Hive, Spark, Cloudera, etc.
- Main data architectures: Lambda Architecture, Kappa Architecture, event-driven, CQRS, data mesh.
- Options for modelling relational data: Data Vault 2.0, snowflake and star schemas.
- Components for managing real-time contexts: Kafka, Spark Streaming, Akka Streams, Flink.
- Options for storing large volumes of data: NoSQL (MongoDB, Cassandra, Redis, etc.) and indexers (Elasticsearch, Solr).
- Cloud-based data platforms.
- The impact of containerisation in the data context: Docker, Kubernetes, OpenShift.





# 1. AI: DATA

Data Science point of view:

- Descriptive analysis: studying normal data distribution through metrics such as the mean, variance, standard deviation and percentiles. Also applying statistical tools such as hypothesis tests and p-values, to extract information about the distribution of the data.
- Classification algorithms (supervised), models: logistic regression, random forest, evaluation metrics – accuracy, precision, recall.
- Clustering algorithms (unsupervised): k-means, hierarchical clustering.
- Recommendation algorithms: content-based, collaborative filtering.
- Text mining and natural language processing (NLP): unstructured text analysis, both in cleaning (lemming, stemming, tokenisation) and model (sentiment analysis, text classification) phases.
- Data science tools: focus on Jupyter and Anaconda for Python code development, with Jupyter Notebooks support.
- Data visualisation: Python packages for exploratory analysis like Seaborn, Matplotlib.



## 2. AI: MACHINE LEARNING

This specialisation focuses on:

- using leading AI and ML techniques such as image and video intelligence, text analytics, language understanding and predictive systems
- an in-depth study of the cognitive systems leading industry vendors offer and their application in multiple contexts such as autonomous things, digital assistants, predictive maintenance, intelligent process automation and smart analytics.

This specialisation has a strong, hands-on component, with students working on real-life projects using platforms and frameworks from leading industry vendors.

Implementing state-of-the-art algorithms and models, applying deep learning techniques, and looking in-depth at automated ML tools, go hand in hand with a results-driven enterprise approach that uses evaluation metrics to define and measure the effectiveness of the solutions.



# 3. CLOUD

This specialisation explores the main components that characterise IaaS and PaaS solutions. Resiliency, scalability and agility are key concepts in cloud technologies, with cloud considered the best enabler for an Infrastructure-as-a-Code approach where DevOps methodologies can be exploited to their full potential.

## The DevOps approach:

- DevOps principles.
- Key processes (continuous integration, continuous delivery and deployment, rugged DevOps/devsecops, chatops, Kanban) and their relationship to IT Service Management and Cloud.
- Open-source technologies for configuration management: Puppet, Chef, Ansible.
- Cloud-native DevOps techniques.



# 3. CLOUD

**Microservice-based architectures. Using containerisation in hybrid cloud architectures: Docker, Kubernetes, OpenShift:**

- Designing microservice architectures.
- Managing microservice architectures.
- Continuous integration and continuous delivery (CI/CD) in containerised architectures.
- Cloud-native microservice architectures: serverless.

**Serverless development:**

- Main PaaS services.
- An example of a Serverless project: back-end IoT architectures.





# 5 REASONS TO JOIN THE MASTER'S PROGRAMME

1. A full-time job in Reply
2. Specialised knowledge
3. Hands-on experience
4. Main vendor offering
5. Reply methodology





# BECOME ONE OF THE FUTURE INDUSTRY'S LEADING PLAYERS

Applications are open from 21<sup>st</sup> September to 2<sup>nd</sup> November, 2020.

To find out more and apply, visit [master.reply.com](https://master.reply.com)



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