

ARTIFICIAL INTELLIGENCE & CLOUD: HANDS-ON INNOVATION

2nd level Specializing Master's programme



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.



REPLY

Reply specialises in the design and implementation of solutions based on new communication channels and digital media.

Through its network of specialist companies, Reply supports some of Europe's leading industrial groups in Telco & Media, Industry & Services, Banks & Insurance, and Public Administration to define and develop business models, suited to the new paradigms of Big Data, Cloud Computing, Digital Media and the Internet of Things. Reply services include: Consulting, System Integration and Digital Services.



REPLY





POLITECNICO DI TORINO MASTER SCHOOL

For more than 160 years, the Politecnico di Torino has been one of the most prestigious public institutions for education, research, technological transfer and services in all sectors of architecture and engineering.

The Specializing Master's programme and Lifelong Learning School stands as a center of excellence aiming to define ground breaking educational paths in response to the business context needs.

The School aims to offer a technical and managerial training that will specialize the knowledge base gained with a traditional degree, providing students with the tools to adapt successfully to the constantly changing job market requirements and increasing their entrepreneurial attitude.



ARTIFICIAL INTELLIGENCE & CLOUD: HANDS-ON INNOVATION

This specializing Master's programme, developed by Reply and the Politecnico di Torino, 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 the Politecnico di Torino and [Reply's offices](#).



WHO IS THE SPECIALIZING MASTER'S PROGRAMME FOR?

The 12-month programme is for students with a Master's 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 programme. 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, Reply pays 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 programme'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 ML.

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

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



SPECIALISATIONS

The Specializing 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 programme 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!

1. A full-time job in Reply
2. Specialised knowledge
3. Hands-on experience
4. Main vendor offering
5. Reply methodology and Politecnico di Torino highly qualified academic staff



BECOME ONE OF THE FUTURE INDUSTRY'S LEADING PLAYERS

Applications are open from 21st September to 2nd November, 2020.

To find out more and apply, visit master.reply.com



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