

INPT Programs: Data Science, Cybersecurity, and Cloud/IoT

Program Overview

The Data Science program at INPT (Institut National des Postes et Télécommunications) aims to train skilled engineers in the management, analysis, and exploitation of large-scale data. This field combines data engineering - focusing on the design, storage, and retrieval of data - with data science - focusing on the statistical analysis, machine learning, and extraction of insights from data. The program emphasizes practical training, interdisciplinary knowledge, and ethical data practices, preparing graduates to tackle modern data challenges across industries.

Curriculum Highlights

The curriculum spans six semesters, combining scientific, technical, managerial, and communication skills:

- S1-S2: Fundamentals in math, programming, electronics, databases, statistics, and computer systems.
- S3-S4: Advanced object-oriented development, JEE web applications, data modeling, Big Data, cloud computing, and project work.
- S5-S6: Advanced topics in mobile/web app development, NoSQL databases, machine/deep learning, cybersecurity, and a final capstone project.

Program Objectives

- Equip engineers with advanced tools and methodologies for data management and analysis.
- Provide knowledge on data modeling, trend analysis, and machine learning algorithms.
- Enable the creation of innovative solutions based on organizational data.
- Promote cybersecurity awareness and ethical data handling.
- Enhance communication skills for presenting analytical results.
- Offer hands-on projects across various sectors including health, finance, and industry.

Core Competencies Developed

1. Programming: Python, R, Scala for scripting and development.
2. Data Analysis: Data wrangling, visualization (Pandas, NumPy, Matplotlib).
3. Machine Learning: Supervised, unsupervised, and deep learning techniques.

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4. Data Engineering: ETL pipelines, SQL/NoSQL databases, architectures.
5. Visualization: Interactive dashboards and reports.
6. Big Data: Hadoop, Spark, and real-time data flow systems.
7. Cybersecurity: Risk management, data protection, and auditing.
8. Agile Management: Scrum, Kanban for project tracking.
9. Communication: Technical writing and stakeholder presentations.

Career Opportunities in Data Science

- Data Engineer
- Data Architect
- Database Administrator
- Software Developer
- Data Analyst
- Real-Time Data Analyst
- Data Scientist
- Machine Learning Analyst
- Data Engineering Consultant

Cybersecurity and Digital Trust Program Overview

The Cybersecurity and Digital Trust (ICCN) program at INPT aims to train engineers in system and network security, equipping them to protect digital infrastructures and user data. This training responds to the increasing threats posed by cyberattacks and misuse of personal data, aiming to rebuild trust in digital services. The goal is to empower engineers with both technical and regulatory knowledge to design and implement secure infrastructures that ensure privacy, data protection, and digital trust-enabling the development of key online services such as e-government, e-commerce, and e-payment.

ICCN Graduate Profile

Graduates will be capable of ensuring data protection and maintaining secure, operational IT infrastructures. They will:

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- Prevent intrusions and maintain service availability, integrity, and confidentiality.
- Secure electronic transactions.
- Design and deploy technical and organizational solutions for secure digital usage.

Key Technical Skills

- Design robust security solutions.
- Conduct audits in accordance with Moroccan regulations and global standards.
- Analyze IT risks and produce security risk maps.
- Develop, enforce, and monitor security policies.
- Evaluate and test security measures against cyber threats.
- Choose appropriate configurations and technologies to secure digital services.
- Manage cybersecurity incidents and coordinate organizational response.
- Build secure IT architectures and deploy adapted system/network configurations.
- Ensure continuity and reliability of IT infrastructures.
- Assess the security of mobile and web applications.

Managerial and Soft Skills

- Lead teams and demonstrate strong leadership.
- Collaborate efficiently in multi-stakeholder environments.
- Communicate clearly in oral and written formats.
- Innovate and develop new digital services.
- Uphold ethical standards and respect for individuals and the environment.

Career Opportunities in Cybersecurity

- Digital Trust Engineer
- Cybersecurity Architect
- Security Incident Analyst
- Information Systems Security Manager
- Network Security Engineer

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- Systems Security Engineer
- Security Auditor (Technical & Systems)
- IT Risk Analyst
- Network Engineer
- Systems Engineer
- Data Protection Officer
- Technical Support Engineer
- Web and Mobile Application Pentester

Cloud and IoT Program Overview

The Cloud and IoT Systems Engineering program at INPT aims to train engineers capable of leading the proactive digital transformation in Morocco's public and private sectors. As the digital era evolves, the integration of IoT and cloud technologies is essential for handling the massive data volumes generated by billions of connected devices. With cloud computing enabling scalable computation and data centers ensuring reliable storage, this program prepares future engineers to develop, deploy, and manage distributed infrastructures.

Objectives and Context

This program addresses:

- The growing demand for engineers in digitalization.
- The importance of IoT and cloud in data collection, processing, and storage.
- The need for engineers to play leadership roles in designing secure, efficient digital ecosystems.
- The future model of businesses outsourcing IT infrastructure to focus on core missions.

Core Competencies

****Technical Know-How:****

- Core knowledge in computer science and software engineering.

****Design Skills:****

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- Ubiquitous systems including IoT
- Cloud solutions (infrastructure & application)
- Big Data processing and storage

****Innovation Capabilities:****

- Novel services and applications
- Embedded systems
- Evolving computing architectures

Operational Competencies and Soft Skills

- Project management and network administration
- Embedded system engineering
- Strong communication in multiple languages
- Global awareness and cultural adaptability
- Leadership and teamwork readiness
- Integration of technical, business, and societal disciplines
- Exposure to real-world projects, internships, and job simulations

Career Opportunities in Cloud and IoT

- Software Development Engineer
- Ubiquitous Systems Engineer
- Big Data Engineer
- Systems Integration Engineer
- Service Development Engineer
- Systems and Network Engineer
- Cloud Deployment Engineer
- Embedded Systems Engineer
- Cloud Operations Engineer
- Entrepreneur Engineer
- Research Engineer

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- Network Architect
- Security Engineer for Systems, Applications, and Services