

PQ-NEXT Core: The Quantum Education Notebook

**Preparing academia for the
post-quantum era**



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The To-Do list of educating for a quantum future:

- Introduce quantum-related concepts early.
- Develop specialised knowledge at master's level.
- Give students practical experience.
- Connect students with research.
- Create opportunities for bachelor's, master's and PhD work.
- Bring together different disciplines.
- Connect academic research with industry.
- And work on the migration from today's systems towards post-quantum infrastructures.



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The transition towards post-quantum technologies is already influencing research, education and industries. Within PQ-NEXT, our partners bring together expertise in post-quantum cryptography, cybersecurity, telecommunications, quantum communications, network infrastructures and more.



But how does this work translate into education?

When should students start learning about quantum technologies? What skills do they need? How can they gain practical experience? And how can universities connect education and research with real-world needs?



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Three PQ-NEXT academic partners, **AGH University of Krakow, RheinMain University of Applied Sciences and Arts, and Universidad Politécnica de Madrid** are sharing their perspectives on students, skills, research and education in the quantum transition.



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PQ-NEXT influence on teaching activities & curriculum development

AGH University of Krakow



Compulsory master's-level course dedicated to post-quantum cryptography.



Links teaching with ongoing research projects, international collaboration and standardisation activities.

RheinMain University of Applied Sciences and Arts

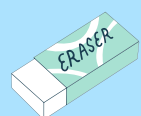


Courses in telecommunications networks, post-quantum cryptography, cybersecurity, digital government and ICT for smart cities.

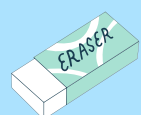


Practical student projects and bachelor's, master's and PhD theses.

Universidad Politécnica de Madrid



Incorporating research on post-quantum algorithms and hybrid cryptography into the curriculum.



Using insights from large-scale pilot deployments to support a secure quantum-safe transition.



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Skills today's students should develop to be ready for the post-quantum era

Quantum technologies

Quantum computing, quantum mechanics and quantum communications.

Post-quantum cryptography

Post-quantum algorithms, cryptographic solutions and hybrid schemes.

Cybersecurity

Security analysis, cybersecurity, risk management and vulnerability assessment.

Networks and telecommunications

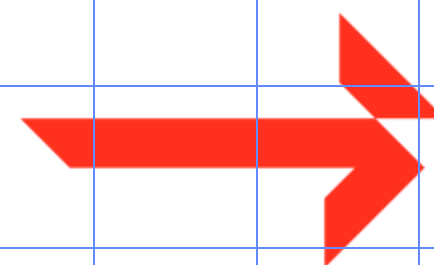
Network protocols, telecommunications infrastructures and quantum communication networks.

Computing infrastructure

Data centres, cloud computing and contemporary systems and networks.

Practical implementation

Implementation, integration, testing and performance evaluation.



From the classroom to practical work

The below combination allows education to remain connected to the research and practical work taking place within the universities and the PQ-NEXT project.



Learning

Building theoretical foundations.

Applying

Working with algorithms, systems and infrastructures.

Testing

Evaluating and benchmarking solutions.

Researching

Exploring topics through student projects and theses.



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Join our Quantum Transition

<https://linktr.ee/pqnext>



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