

# Quantum Computing Class Slide Deck Outline

## 1. Title Slide

- Title: "Quantum Computing: A Hands-On Introduction"
- Subtitle: Exploring IBM's Quantum Experience Platform
- Visual: Embed YouTube video: [https://www.youtube.com/embed/7aa\\_ik\\_UYTw](https://www.youtube.com/embed/7aa_ik_UYTw)
- PACT Label: "PACT" (all letters bold).

## 2. PACT Framework Overview

- Title: "Understanding Quantum Computing with PACT"
- People: Key influencers and thought leaders to follow.
- Applications: Real-world uses and potential for the technology.
- Concepts: Foundational ideas and principles to grasp.
- Terms: Vocabulary and jargon to master.
- PACT Label: "PACT" (all letters bold).

## 3. Introduction to Quantum Computing

- Key Points:
  - What is Quantum Computing?
  - Differences between classical and quantum computing.
  - Concepts: Superposition, Entanglement, Interference, Decoherence.
    - Interference: Similar to noise-canceling headphones.
- Visual: Infographic comparing classical vs. quantum computing.
- PACT Label: PaCT.

## 4. IBM Quantum Experience Overview

- Key Points:
  - Introduction to the platform.
  - Why use IBM Quantum for this class?
- Visual: Screenshot of the IBM Quantum dashboard.
- PACT Label: PACT.

## 5. Getting Started

- Key Points:
  - Step-by-step guide for creating an account.
  - Emphasize free resources and tools.
- Visual: Screenshots of the sign-up process.
- PACT Label: PACT.

## 6. Exploring the Quantum Composer

- Key Points:
  - Introduction to the Quantum Composer interface.
  - Quantum gates represent microwave pulses.
  - Build a simple circuit and simulate.
- Visual: Annotated screenshot of Quantum Composer.
- PACT Label: PaCt.

## 7. Running Your First Experiment

- Steps:
  - Build and test a basic quantum circuit.
  - Submit and interpret results.
- Visual: Example of a simple circuit and output.
- PACT Label: PaCt.

## 8. Real-World Applications

- Key Points:
  - Applications in cryptography, optimization, and drug discovery.
- Visual: Use-case examples by industry.
- PACT Label: PaCT.

## 9. Challenges and the Future of Quantum Computing

- Key Points:
  - Pre-Fault Tolerant Era: Error mitigation and noisy systems.
  - Fault-Tolerant Era: Scalable, reliable quantum computers.
  - Key Challenges: Decoherence, error mitigation, and error correction.
    - "Building a perfect computer out of imperfect parts."
- Visual: Diagram showing progression from noisy to fault-tolerant systems.
- PACT Label: PaCt.

## 10. Hands-On Activity Instructions

- Key Points:
  - Guide students through building and running circuits.
  - Provide tips for interpreting results.
- Visual: Example task or checklist.
- PACT Label: PaCt.

## 11. Wrap-Up and Q&A

- Key Points:
  - Recap session objectives.
  - Encourage questions and feedback.

- Visual: Summary graphic with a call to action.

- PACT Label: PaCt.

## 12. Next Steps and Resources

- Suggestions:

- Explore IBM Quantum further.

- Watch educational videos (YouTube, e.g., <https://www.youtube.com/watch?v=OWJCfOvochA>).

- Read articles and reports (e.g., Nature, Medium, IBM Quantum Decade).

- Visual: List of resources with logos/icons.

- PACT Label: PaCT.