Updated 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

   - 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. Ethics and Responsible Quantum Computing

  - Key Points:

    - Fairness and transparency in algorithms and applications.

    - Environmental impact of quantum computing hardware.

    - Accessibility and equitable distribution of benefits.

  - Visual: Icons representing ethics, balance, and global impact.

  - PACT Label: PaCT.

11. 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.

12. 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.

13. 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.