ENGAGING CONNECTING WITH OTHERS **INCLUSIVE** USING SHARED LANGUAGE

CONNECTING WITH **GLOBAL** CULTURES AND **DIVERSE** BACKGROUNDS

EMPATHETIC ASSUMING GOOD INTENTIONS FORWARD-LOOKING OUTLOOK

BUILDING RELATIONSHIPS **CREATING EXPERIENCES** TEAMMATE-

ORIENTED **POSITIVE** **LIFTING OTHER VOICES** ACTIVE LISTENING

ACCOUNTABLE DOCUMENTING AND SHARING PROJECTS **LEARNING**

HONESTY **COLLABORATING** BUILDING TEAM TRUST

USING **RESPECTFUL** LANGUAGE **BE YOU!**

OPEN ABOUT YOURSELF AND YOUR GOALS

GENUINE COMFORTABLE &

FUN!

We appreciate your support in keeping this experience for registered attendees only, and welcome your feedback and suggestions for any improvement. Please do not share the lecture and lab materials outside the attendees of the Qiskit Global Summer School.

ABOUT

Welcome to the first-ever Qiskit Global Summer School hosted by IBM Quantum. We are excited to have you join us for a 2-week dive into quantum computing through daily lectures and lab sessions, as well as a vibrant community set up for you to meet other students and collaborate together to solve problems. Through education and open science, we aim to build and shape a diverse, equitable, and inclusive quantum workforce. We're thrilled to have you join us on this journey.

Please read through this Attendee Guide to find answers about the structure, setup, agenda, and resources that accompany the Summer School. This is not a passive class - whether you're in lectures only, or also participating in the lab sessions, we need your engagement to make it a success. Grab a notebook and a pen, and find your favorite chair. The Qiskit Global Summer School is just about here.

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LINKS

Join the the Discord Server

Read the Textbook

Share the Website

Follow Qiskit on Twitter

SUMMER SCHOOL SYLLABUS

July, 20 **Monday**

WELCOME & OPENING REMARKS
Presenter: Scott Crowder, Liz Durst

QUBITS & QUANTUM STATES, CIRCUITS, MEASUREMENTS
Lecturer: Elisa Baumer

ASSOCIATED TEXTBOOK READING
Sections 1.1 - 3.2

Afternoon Lab Lead: Abe Asfaw

July, 21 **Tuesday**

WRITING & RUNNING QUANTUM
Programs with Textbook Quantum Algorithms
Lecturer: Elisa Baumer

ASSOCIATED TEXTBOOK READING
Sections 3.4-3.6, 3.10

Afternoon Lab Lead: Abe Asfaw

July, 22 **Wednesday**

SHOR'S ALGORITHM I
The Quantum Fourier Transform and Quantum Phase Estimation
Lecturer:Abe Asfaw

ASSOCIATED TEXTBOOK READING
Sections 3.7-3.8

Afternoon Lab Lead: Abe Asfaw

July, 23 **Thursday**

SHOR'S ALGORITHM II
Going From Factoring to Period-finding and Writing the Program
Lecturer:Abe Asfaw

ASSOCIATED TEXTBOOK READING
Section 3.9

Afternoon Lab Lead: Abe Asfaw

July, 24 **Friday**

QUANTUM ERROR CORRECTION
via Repetition Codes
Lecturer: James Wootton

ASSOCIATED TEXTBOOK READING
Section 5.1

Afternoon Lab Lead: James Wootton

July, 27 **Monday**

SUPERCONDUCTING QUBITS I
Quantizing a Harmonic Oscillator, Josephson Junctions
Lecturer: Zlatko Minev

ASSOCIATED TEXTBOOK READING:
Sections 6.3

Afternoon Lab Lead: Nick Bronn

July, 28 **Tuesday**

SUPERCONDUCTING QUBITS II
Readout and Circuit QED, Calibrating a Qubit Frequency and Readout
Lecturer: Zlatko Minev

ASSOCIATED TEXTBOOK READING:
Sections 6.1, 6.4

Afternoon Lab Lead: Nick Bronn

July, 29 **Wednesday**

QUANTUM CHEMISTRY I
Going from Problem Description to Qubit Hamiltonian for H_2 and LiH
Lecturer: Antonio Mezzacapo

ASSOCIATE TEXTBOOK READING:
Section 4.1.2 + additional reading

Afternoon Lab Lead: Antonio Mezzacapo

July, 30 **Thursday**

QUANTUM CHEMISTRY II
Solving qubit Hamiltonian for H_2 and LiH using VQE
Lecturer: Abhinav Kandala

ASSOCIATE TEXTBOOK READING:
Section 4.1.2 + additional reading

Afternoon Lab Lead: Abhinav Kandala

CAREER PANEL JULY 31

Join us for an exciting Career Panel session with industry-leading speakers and their insights on how to start your career in quantum.

ABOUT LECTURES

Duration: 3 hours (with breaks)
Curriculum starts with quantum fundamentals and leads all the way to quantum chemistry
Q&A available during lecture (use the question feature on Crowdcast!)
Be an active audience member - take notes along with the lecturers!

THE FUN DOESN'T END WITH THE SUMMER SCHOOL...

AUGUST 5, 2020
QISKIT SUMMER SCHOOL
FINAL PROJECT! *(OPTIONAL)*

Now that you know about quantum.... What's next? What can you do with it? Level up summer school learnings and recent education with the Final Project. Develop an expanded quantum understanding by working on a unique challenge with the insights from your teammates and recent learnings to guide you along the way.

AUGUST 15, 2020
APPLY TO BECOME A
QISKIT ADVOCATE!

The Qiskit community is comprised of some of the best minds in all of quantum. There's even a program, the Qiskit Advocates, for top-notch contributors and members to apply and join. Qualified people must pass a test showing their knowledge, and also link to different ways they've contributed to the community at large. Learn more about the program from Junye Huang's blog post here.

ABOUT DISCORD

Discord will be used for all Qiskit Global Summer School event communications, updates, study groups, lab work, Q&A, and more. Students will be able to "raise their hand" to get support - notifying mentors directly!

GET SET UP IN THREE EASY STEPS!

1 Download Discord and Join the Summer School Server

2 Catch up on #Announcements, try out commands in #Sandbox, and review important information in #Welcome!

3 Have Fun! Learn lots! Qiskit on!

SUBMITTING LAB WORK

A link to the lab recording and the workbook download file will be posted on !!-instructions-!! in the Summer School Discord each day around 1:00 PM EDT

An internet connection will be required in order to submit the workbook (a Jupyter notebook)

Through the exercise make sure to read, complete, and submit each cell in order. Loss of internet will not cause a critical failure but if something does happen, you can submit again. Only the highest score will be counted

In the final field in the exercise you will provide your name and email. It is critically important that you provide the same exact name and email each time. Submit your answer by running the cells in order

If any concerns arise upon submitting, please reach out in !!-support-!!.

The grading will take a minute or two to complete. Once finished, a status indicator will appear below your submission box. It will indicate the passing status (✅ or ❌), which is uploaded to IBM.

The deadline for all workbooks to be submitted is July 31st at 11:59pm EDT. Note that the process does take time, so if you wait until the last minute, you probably will miss the deadline. Do not wait until the last minute. No past-due workbooks will be accepted

ABOUT LABS

Duration: 1 hour (or less)

Demonstrating lecture material with hands-on exercises on quantum programming using Qiskit

Pre-recorded session complete with problem set exercise.

GUIDELINES FOR LABWORK

Labs will not be reviewed during lecture, so take the time to sit down and review your work.

For the best experience, join and work with a study group for material review and application.

Don't forget! There's an entire community here and ready to help you!

RECORDINGS & LAB SOLUTIONS

Lab recordings will be released daily at 1:00 PM EDT.

Solution videos will be posted at 1:30 PM EDT the following day for access and review.

IMPORTANT NOTE!
You have the option to submit your notebook multiple times, only the highest score will contribute to your cumulative average.

CERTIFICATES

Only people who are invited to and complete all of the lab work will be getting a certificate of completion.

Lab work will be assigned as Jupyter notebook exercises. The notebooks must be completed and submitted by the end of the Summer School, on **July 31 (11:59 PM EDT)** with a cumulative average score of 65% or higher in order to receive a certificate.

ABOUT STUDY GROUPS

Meet other students, study together, and work through problem sets as a group.

IBM Quantum will provide dedicated support and mentors for lab work and exercises.

ONLINE

HOW TO START OR JOIN A GROUP

Kick off a study group by using the command **;group new casual teamSize description**
Example: ;group new casual 4 group best team for students at IIT Kharagpur

Connect with existing study group by using the command **;group casual**

#FIND-STUDY-GROUP

Cast a wide net around the world to create study groups with fellow students around the globe.

CONNECT IN REGIONAL GROUPS

Time-zone centric channels are pre-created in Discord and you will be tagged in your appropriate channel. Meet other people (with a top obstacle removed: TIME!) and form groups from there!

STUDY GROUP BEST PRACTICES

[Tips and tricks for virtual collaboration](#) and team work!

GROUP GUIDELINES

Within the Study Group categories, all lab students can create their own dedicated channel by hitting the " + " symbol next to the category - come up with a fun group name to show off!

Study groups should have up to 10 people (but no more than that)

Don't feel restricted to your own time zone - feel free to jump around to the active time zone that interests you!

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QISKIT INTERACTIVE TEXTBOOK
For supplemental information, guidance, and exercises

Whether you are learning, teaching, or contributing - the Qiskit Textbook is an incredible resource available to all. Check out some of the exercises and advanced lessons to level up your own skills before (and during!) the Summer School!

RESOURCES

1 Learn About & Install Qiskit
Keep on learning about Qiskit and install before the Summer School. From high-level technical learnings to exciting connections in the community!

2 Qiskit Slack Community
Become a part of the connected and ever-growing community of Qiskitters on Slack.
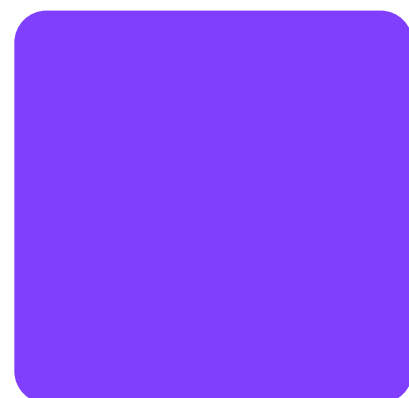
3 IBM Quantum Experience
Create your IBM ID and have full access to learn, develop, and run quantum programs on real quantum computers via this cloud platform.

4 Learn at Khan Academy
The prerequireisties for the summer school are Basic Probability, Matrix Multiplication, and Python. You can find helpful materials covering all of these in the Khan Academy.

Tip!

Use the YouTube tutorial for install help - or check out this documentation!

Tip!

Check out the IBM Quantum Experience beginners guide to get started!

WHAT TO EXPECT IN A VIRTUAL EVENT

NAVIGATE THIS VIRTUAL EVENT TO YOUR MAXIMUM ADVANTAGE

AS EASY AS 1, 2, 3...

1 Enter the event with a positive attitude! Have your own goals, and don't let a webcam slow you down from reaching them. Our top recommendations are to get comfortable using your webcam, and to not be shy raising your hand to ask (or answer) questions

2 Seems simple enough, but it's worth a quick reminder: update your software and check your connections. Is your mic connected? Are your permissions up to date? Do a quick test run with a friend to make sure you are all set and ready to go when the event starts!

3 Don't get overwhelmed, and enjoy yourself! You are here to share an experience with others, and we all want to make it as enjoyable and educational as possible. The Summer School community will be with you every step of the way; watch your friends and colleagues unwind and get to know each other.
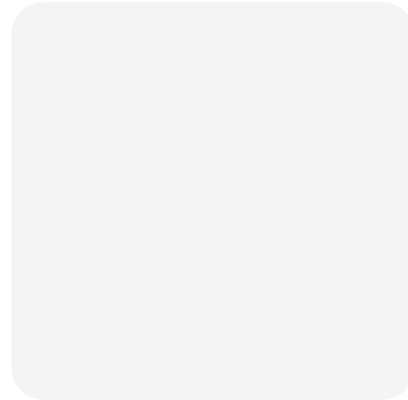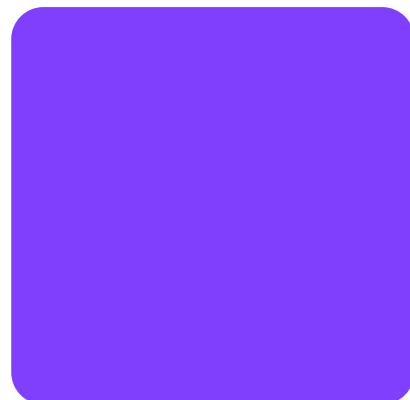
CODE OF CONDUCT

Make sure and review and
be familiar with the official
!CodeofConduct

ANY QUESTIONS?

LET US KNOW!