

DATE

Faculty Development Program will be held during
3rd to 7th January 2022

REGISTRATION:

on ATAL Portal only

<https://www.aicte-india.org/atal>

To, **Mr. Vijay More,**

Assistant Professor,

Department of Computer Engineering,
MET's, IOE, Bhujbal Knowledge City
Adgaon, Nashik-422003, Maharashtra, India
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For more details please visit: www.metbkc.edu.in

FACILITIES



CHIEF PATRON

Hon. Sameer Bhujbal

Trustee, MET's BKC, Nashik

Hon. Shefali Bhujbal

Chief Administrator, MET's BKC, Nashik

PATRON

Dr. V. P. Wani

Principal,

MET's Institute of Engineering, BKC, Nashik

CONVENER

Dr. M. U. Kharat

HOD, Dept. of Computer Engineering

COORDINATOR

Mr. Vijay More

ORGANIZING COMMITTEE

Dr. S. V. Gumaste

Dr. Prashant Yawalkar

Dr. Priti Metange

Dr. Kalpana Metre

Mr. Shailendra Vidhate

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Mr. Ashutosh Kale

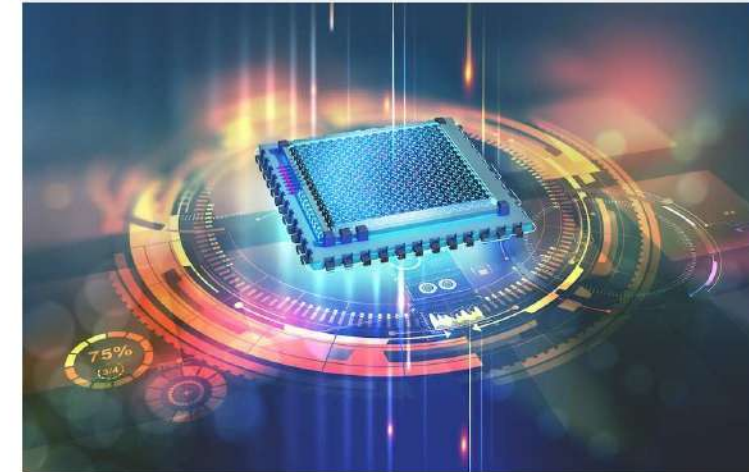
Mr. Atul Chaudhari

Mr. Manoj Suri

ONLINE FACULTY DEVELOPMENT PROGRAM on

QUANTUM COMPUTING

3rd to 7th January 2022



Sponsored by

**AICTE Training And Learning (ATAL)
Academy Scheme**



Organized by

**Institute of Engineering,
Department of Computer Engineering**

MET Bhujbal Knowledge City

Adgaon, Nashik - 422003

Tel.: (0253) 2303442, 2303515 | Telefax: (0253) 2303203

email: enquiries@bkc.met.edu

Website : metbkc.edu.in

ISO 9001:2015 certified. MET is an NGO in special consultative status with UN (ECOSOC)

About Institute

Mumbai Educational Trust (MET) is a public charitable trust established in year 1989 with a mission to radically redefine education system in India. MET League of colleges has contributed over 30,000 professionals to the Indian and global business houses.

In the line with its commitment to provide world class education in India, MET has created state-of-the-art Bhujbal Knowledge City (BKC) at Nashik, Maharashtra. It promises to be the answer to the ever changing need of education scenario. The campus is situated at Adgaon, Nashik, with 34 acres of lush green landscapes having 4 lack sq.ft. of campus building spaces. The college offers Institute of Engineering, Institute of Management, Institute of Pharmacy, Institute of Technology (Polytechnic), Institute of Information Technology, Institute of Distance Learning.

Institute of Engineering offers various disciplines viz. Computer, IT, MCA Electronics, Electronics & Telecommunication, Mechanical, Electrical, Civil imparting UG and PG education along with research, approved by AICTE and Affiliated to Savitribai Phule Pune University, Pune. MET's BKC has excelled in academics, cocurricular and Extra-curricular activities.

About Department

The Computer Engineering Department of MET's Institute of Engineering is established in the year 2006, and has grown over the years into a competent department with state of the art computing facilities, and dedicated faculty. Having started with a four year under-graduate program, B.E (Computer Engineering), the department proudly host Post Graduate program, M.E Computer (Computer Engineering) along with Research Center. The intake of under graduate program is 120 (increased from 60 to 120 wef 2018-19) and post graduate program is 24. As of now, there are 12 research scholars associated with research center.

The goal of the department is to establish state of the art computing environment to develop competent computer engineers imbibe with the spirit of professionalism and responsible citizenship. The department emphasizes the Vision of the Mumbai Education Trust's, for excellence in education. Highly qualified, dedicated faculty and good infra-structure facilities, make this dream realizable.

Computer Engineering Department had re-accredited for second cycle with effect from 2020-21 to 2022-23 upto 30-06-2023

PROGRAMME OBJECTIVES:

- Focus on introduction to Quantum Computing and its applications
- Focus on different Quantum Computing algorithms and their applications
- Exposure to different tools and methodologies available in this domain.

COURSE CONTENTS:

- Introduction to Quantum Computing
- Evolution of Quantum Computing Architecture
- Quantum Algorithms and their Applications
- Quantum Business Models and importance in the application industry
- Role of Quantum Computing in various domains
- Quantum Circuits Significance
- Introduction to Quantum Mechanics
- Relation of Machine Learning and Quantum Computing
- Hands on Quantum Computing with different tools (e.g. IBM Quantum Circuit Composer)

EXPECTED OUTCOMES

This FDP will serve as an introductory concepts as well as hands-on sessions on Quantum Computing domain. At the end of the FDP the learner should be able to understand concepts and tools and techniques available in the field of Quantum Computing. Learner also will be able to provide conceptual solution and preliminary demonstration of real life problems based on the knowledge acquired on Quantum Computing.

WHO SHOULD PARTICIPATE?

- The program is open to the Faculties of AICTE approved Engineering & Polytechnic Institutions.





REPORT

Quantum Computing

Date: 3rd to 7th January 2022, Institute Name: MET's Institute of Engineering, Bhujbal Knowledge City, Nashik, Department of Computer Engineering

WELCOME TO
One Week Online
Faculty Development Program (FDP) on
QUANTUM COMPUTING
3rd to 7th January 2022
Funded and Sponsored by AICTE-ATAL

Coordinator
Prof. Vijay B. More

Head of Department
Dr. M. U. Kharat

DEPARTMENT OF COMPUTER ENGINEERING
UG Program Accredited by NBA



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DTE CODE : 5151

Quantum Computing FDP

Quantum Computing 5-Days AICTE sponsored FDP was conducted from 3rd to 7th January 2022 in which around 175 participants from different parts of the country participated.

The speakers for the 5-day FDP on “Quantum Computing” were:




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**One Week Online
Faculty Development Program (FDP) on
QUANTUM COMPUTING**

Sponsored by AICTE-ATAL
3rd to 7th January 2022


RESOURCE PERSON



Dr. Sourav Pal
Director and Professor (Indian Institute of Science Education and Research - IISER),
Kolkata, India
Former Director, CSIR-NCL, Pune, India
Former Professor IIT Bombay, India

TOPIC Introduction to Quantum Computing
Date: 03/01/2022, Session-2 **Time:** 12:00pm - 01:30pm

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**Faculty Development Program on
Quantum Computing**
Topic: Futuristic Paradigms in Quantum Computing





Prof. Dr. M. U. Kharat
HOD Computer Engineering
MET'S, BKC, IOE, Nashik

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3rd to 7th January 2022

RESOURCE PERSON


Dr. Vinod Pachghare
Associate Professor(College of Engineering,Pune),Department of Computer Engineering

TOPIC Role of Quantum Computing in various domains
Date: 04/01/2022, Session-6 **Time:** 02:30pm - 04:00pm

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RESOURCE PERSON


Mr. Manoj Bhatkar
Senior VP, IT Delivery Head(Anand Rathi IT Pvt Ltd),Jodhpur, Rajasthan

TOPIC Quantum Business Models and importance in the application industry
Date: 05/01/2022, Session-7 **Time:** 10:00am - 11:30am

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RESOURCE PERSON


Dr. Rubell Marion Lincy G
Assistant Professor(Indian Institute of Information Technology (IIIT), Kottayam, Kerala)

TOPIC Quantum Algorithms, Demonstration with Qiskit
Date: 05/01/2022, Session-8 **Time:** 12:00pm - 01:30pm

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RESOURCE PERSON




Dr. Raman Kumar Jha
Vice Chancellor (Amity University), Ranchi, Jharkhand

TOPIC Introduction to Quantum Mechanics for Quantum Computing and some aspects

Date: 05/01/2022, session-9 Time: 02:30pm - 04:00pm

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RESOURCE PERSON



Dr. Prasanta K. Panigrahi
Professor(IISER), Kolkata, West Bengal



TOPIC - 1 Quantum Computing Algorithms and Applications with case studies
Date: 04/01/2022, Session-5 Time: 12.00pm -1.30pm

TOPIC - 2 Relation of Machine Learning and Quantum Computing
Date: 06/01/2022, Session-10 Time: 10:00am -11:30am

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RESOURCE PERSON





Dr. Kunal Das
Assistant Professor (Aacharya Prafulla Chandra College), Kolkata, WB

TOPIC Quantum Algorithms, Quantum Circuit, Hands-on on IBM Qisit or Dwave
Date: 06/01/2022, session-11 Time: 12:00pm - 01:30pm

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RESOURCE PERSON

 **Prof. Dr. Bhawana Rudra**
Assistant Professor (Grade II)(National Institute of Technology),Surathkal, Karnataka

TOPIC -1 Evolution of Quantum Computing Architecture
Date: 04/01/2022, Session-4 **Time:** 10:00am - 11:30am

TOPIC - 2 Hands-on on Quantum Computing with different tools
Date: 06/01/2022, Session-12 **Time:** 02:30pm - 04:00pm

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RESOURCE PERSON

 **Dr. Gaurav Trivedi**
Associate Professor (Department of Electronics and Electrical Engineering),IIT, Guwahati, Assam

TOPIC Post Quantum Cryptography: A New Security Paradigm
Date: 07/01/2022, session-13 **Time:** 10:00am - 11:30am

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RESOURCE PERSON

 **Mr. Chirag Patil**
Trainer(Art of Living),Nashik

TOPIC Mental & Emotional Development, Stress Management,Meditation, Human Values and Ethics,Health and Happiness to promote FIT INDIA Movement across the country
Date: 07/01/2022, Session-14 **Time:** 12:00pm - 01:30pm

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The schedule of the workshop was as below-

Dates	10:00 AM to 11:30 AM	30 min break	12.00 PM to 1.30 PM	60 min break	2:30 PM to 4.00 PM
03/01/2022	Session 1: Inauguration, Guest of Honour and Key Note Speech by Prof Dr N. S. Chaudhari, Professor (HAG), IIT, Indore, MP, Address by Principal; Address by HOD	Break	Session 2: Introduction to Quantum Computing (Dr. Sourav Pal, Director, Indian Institute of Science Education and Research Kolkata, India Former Director, CSIR -NCL, Pune, India Former Professor IIT Bombay, India)	Lunch Break	Session 3: Futuristic Paradigms in Quantum Computing (Prof Dr. M U Kharat, Professor and Head, Dept of Computer Engineering, MET's Institute of Engineering, Bhujbal Knowledge City, Nashik)
04/01/2022	Session 4: Quantum Computing Algorithms and Applications with case studies (Dr. Prasanta K. Panigrahi, IISER Kolkata, West Bengal)	Break	Session 5: Quantum Information and Case Studies, (Prof. Dr. Bhawana Rudra, National Institute of Technology, Suratkal, Karnataka (NITK))	Lunch Break	Session 6: Role of Quantum Computing in various domains, (Dr. Vinod Pachghare, Department of Computer Engineering, Associate Professor, College of Engineering, Pune)
05/01/2022	Session 7: Quantum Business Models and importance in the application industry (Mr Manoj Bhatkar, Senior VP, IT Delivery Head, Anand Rathi IT Pvt Ltd, Jodhpur Rajasthan)	Break	Session 8: Quantum Algorithms, Demonstration with Qiskit, (Dr. Rubell Marion Lincy G, Assistant Professor, Indian Institute of Information Technology Kottayam (IIIT) Kottayam)	Lunch Break	Session 9: Introduction to Quantum Mechanics for Quantum Computing and some aspects (Dr. Raman Kumar Jha, Vice Chancellor, Amity University, Ranchi, Jharkhand)
06/01/2022	Session 10: Relation of Machine Learning and Quantum Computing, (Dr. Prasanta K. Panigrahi, IISER Kolkata, West Bengal)	Break	Session 11: Hands on Quantum Computing with different tools (e.g. IBM Quantum Circuit Composer), (Dr. Kunal Das, Asst. Prof., Acharya Pafulla Chandra College, Kolkata, West Bengal)	Lunch Break	Session 12: Hands on Quantum Computing with different tools contd(e.g. IBM Qiskit) (Prof. Dr. Bhawana Rudra, National Institute of Technology, Suratkal, Karnataka (NITK))
07/01/2022	Session 13: Post Quantum Cryptography: A New Security Paradigm (Dr. Gaurav Trivedi, Associate Professor, Department of Electronics and Electrical Engineering, Indian Institute of Technology, Guwahati, - 781039, Assam, India)	Break	Session 14: Mental & Emotional Development, Stress Management, Meditation, Human Values and Ethics, Health and Happiness to promote FIT INDIA Movement across the country (Mr Chirag Patil, Trainer, Art of Living, Nashik)	Lunch Break	Session 15: Feedback, Exam, Valediction

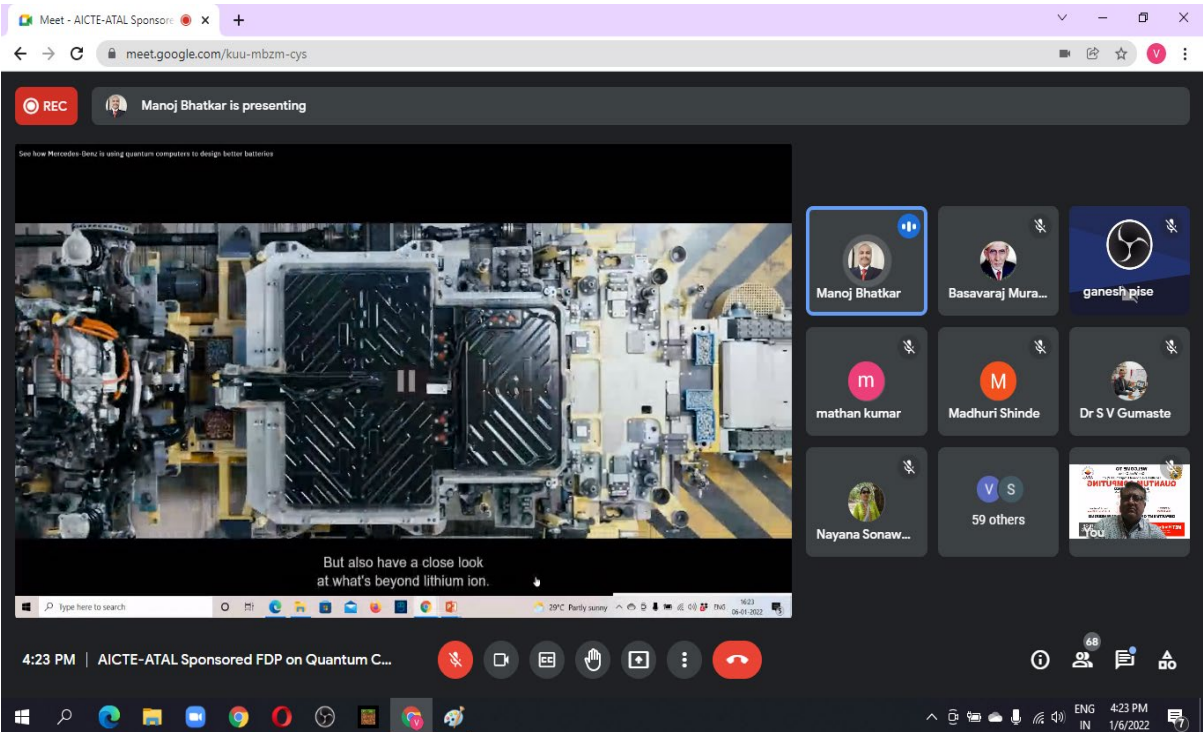
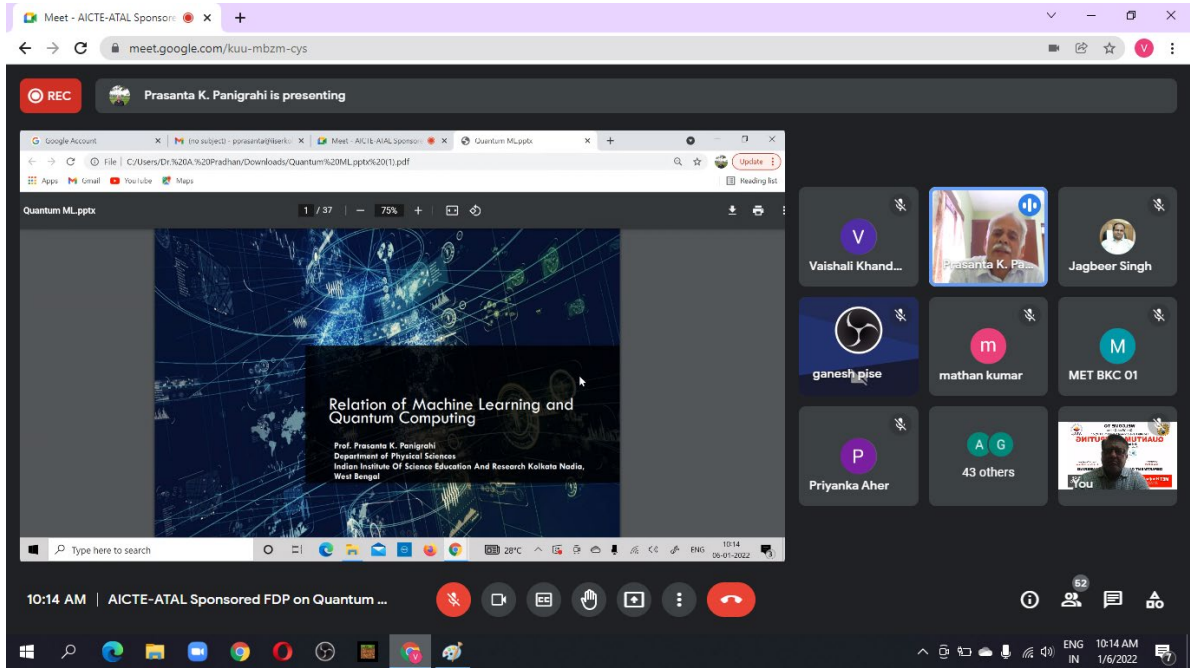
The inauguration was held on 3rd January 2022 online at 10:00 am. Guest of Honour and Keynote Speaker of the function was Prof. Dr. N. S. Chaudhari, Professor (HAG), IIT Indore. Dr. V. P. Wani, Principal MET's IOE, Dr. M. U. Kharat, HOD Comp. Engg.

Dr. V. P. Wani addressed the participants about online FDP and Dr. M. U. Kharat welcome and introduced the Guest of Honor Prof. Dr. N. S. Chaudhari. Prof. Dr. N. S. Chaudhari talked about the Quantum Computing and technical points of it. Prof. Dr. S. V. Ghumaste, proposed Vote of Thanks.

Some screenshots of the inaugural function are as below.

ATAL FDP on Quantum Computing

Some Screenshots



ATAL FDP on Quantum Computing

Meet - AICTE-ATAL Sponsored FDP on Quantum Computing

REC Kunal Das is presenting

Example

- We start with a simple problem. We have two variables, say v_1 and v_2 , and we want a BQM that represents the constraint $v_1 = v_2$. For QUBO and Ising we follow the same process.
- Step 1: Constraint Satisfaction Table

$a_1 v_1 + a_2 v_2 + c = 0$
 $c = 0$

QUBO		Ising		Value
x_1	x_2	s_1	s_2	
0	0	-1	-1	0
0	1	-1	+1	1
1	0	+1	-1	1
1	1	+1	+1	0

$a_1 v_1 + a_2 v_2 + a_3 v_1 v_2 + c = 0$

pusp pain has left the meeting

12:47 PM | AICTE-ATAL Sponsored FDP on Quantum ...

Meet - AICTE-ATAL Sponsored FDP on Quantum Computing

REC Swathi Mummadi is presenting

quantum-computing.ibm.com/composer/5111395e471d682646467216451

IBM Quantum Composer

Untitled circuit saved

Probabilities

State

Phase angle

Statevector

3:46 PM | AICTE-ATAL Sponsored FDP on Quantum C...

In-call messages

Messages can only be seen by people in the call and are deleted when the call ends.

prachi Shahane 1:35 PM
Sir, how many folds dwave gives performance than gpu

You 3:45 PM
participants requested to keep your questions ready attendance committee please post attendance link

Sunita Borse 3:46 PM
Dear participants,
Fill the session wise attendance and day wise feedback available at below link-
<https://drive.google.com/drive/folders/1VaOx1aX5l5JlBfbB4qJk4FcGJUC9v81j2usp?sharing>

Send a message to everyone

The screenshot shows a Google Meet interface with a presentation slide. The slide title is "How Big Systems Can We Deal with?". Below the title, it says "Assuming typical computing setup (number of CPUs, memory, disk space, etc.)". The slide lists four computational methods with their respective atom counts and complexity classes:

- Ab initio method: ~ 100 atoms (N^4 - N^7 at least)
- DFT method: ~ 1000 atoms (N^4)
- Semi-empirical method: $\sim 10,000$ atoms (N^3)
- MM/MD: $\sim 100,000$ atoms (N^2)

The Meet interface includes a top bar with "REC" and "Sourav Pal is presenting", a grid of participant thumbnails on the right, and a bottom bar with system icons and a taskbar. The system tray shows the time as 2:13 PM on 1/3/2022.