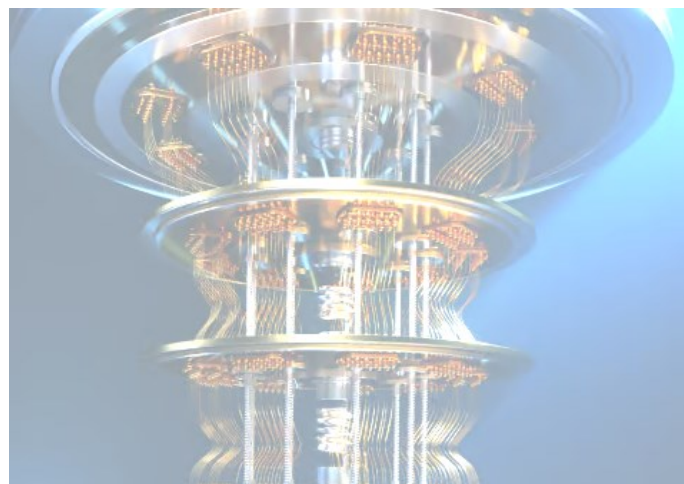# Quantum Computing: Unveiling the Future of Computing

Quantum computing is a revolutionary concept that has the potential to transform the way we process information and solve complex problems. Unlike classical computers that use bits to represent information as either 0 or 1, quantum computers use quantum bits or qubits, which can represent and store information in multiple states simultaneously. This fundamental difference allows quantum computers to perform certain calculations much faster than classical computers, making them ideal for tackling complex problems in fields such as cryptography, chemistry, and artificial intelligence.

How Quantum Computers Work?

Quantum computing is a process that uses the laws of quantum mechanics to solve problems too large or complex for traditional computers. Quantum computers rely on qubits to run and solve multidimensional quantum algorithms. At the heart of quantum computing is the principle of superposition, which allows qubits to exist in multiple states simultaneously. This means that a quantum computer can process a vast number of possibilities simultaneously, leading to exponential increases in processing power compared to classical computers. Another key principle is entanglement, which allows qubits to be interconnected in such a way that the state of one qubit can instantly affect the state of another, regardless of the distance between them. This property enables quantum computers to perform certain calculations much faster than classical computers. Quantum computing solves mathematical problems and runs quantum models using the tenets of quantum theory.

WHAT ARE QUBITS?

Quantum bits, or qubits, are the basic unit of information in quantum computing. Sort of like a traditional binary bit in traditional computing. Qubits use superposition to be in multiple states at one time. Binary bits can only represent 0 or 1. Qubits can be 0 or 1, as well as any part of 0 and 1 in superposition of both states. Qubits are made from trapped ions, photons, artificial or real atoms or quasiparticles, while binary bits are often

Micro-Electro-Mechanical Systems (MEMS): A Revolution in Miniaturization

silicon-based chips. Device typically converts a measured mechanical signal into an electrical signal.

WHAT IS SUPERPOSITION?

Quantum superposition is a mode when quantum particles are a combination of all possible states. The particles continue to fluctuate and move while the quantum computer measures and observes each particle.. The more interesting fact about superposition — rather than the two-things-at-once point of focus — is the ability to look at quantum states in multiple ways, and ask it different questions, said John Donohue, scientific outreach manager at the University of Waterloo's Institute for Quantum Computing. That is, rather than having to perform tasks sequentially, like a traditional computer, quantum computers can run vast numbers of parallel computations.

Quantum particles are able to correspond measurements with one another, and when they are engaged in this state, it's called entanglement. During entanglement, measurements from one qubit can be used to reach conclusions about other units. Entanglement helps quantum computers solve larger problems and calculate bigger stores of data

and information. As qubits experience superposition, they can also naturally experience quantum interference. This interference is the probability of qubits collapsing one way or another. Because of the possibility of interference, quantum computers work to reduce it and ensure accurate results.

How Do Quantum Computers Work?

Quantum computers process information in a fundamentally different way than classical computers. Traditional computers operate on binary bits but quantum computers transmit information via qubits. The qubit's ability to remain in superposition is the heart of quantum's potential for exponentially greater computational power.

Quantum computers utilize a variety of algorithms to conduct measurements and observations. These algorithms are input by a user, the computer then creates a multidimensional space where patterns and individual data points are housed. For example, if a user wants to solve a protein folding problem to discover the least amount of energy to use,
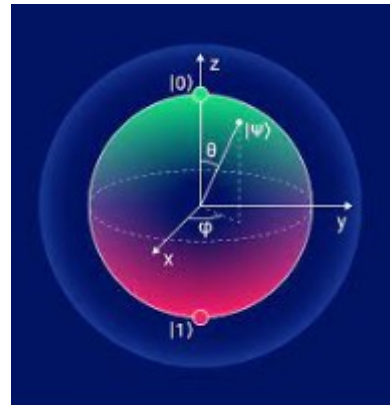
the quantum computer would measure the combinations of folds; this combination is the answer to the problem.

The physical build of a true quantum computer consists mainly of three parts. The first part is a traditional computer and infrastructure that runs programming and sends instructions to the qubits. The second part is a method to transfer signals from the computer to the qubits. Finally, there needs to be a storage unit for the qubits. This storage unit for qubits must be able to stabilize the qubits and certain needs or requirements have to be met. These can range from needing to be near zero degrees or the housing of a vacuum chamber.

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FACULTY ACHIEVEMENTS

Name of the Staff	Name of the award/achievements	Year of Award	Awarding Agency
Dr. Arun Kumar	The world's Top 2% Scientists	Oct 2023	Stanford University
	Reviewer	Dec 2023	Hindwai
Dr. Kavita Avinash Patil	Reviewer	Dec 2023	Advances in Research
PUVIRAJAN T	Topper in NPTEL examination	Sep 2023	NPTEL
Dr. A.B Gurulakshmi	External Examiner for PhD Thesis	Jul 2023	JAIN University
Ajay Sudhir Bale	Reviewer	Sep 2023	IEEE NMITCON Conference
Mamta B S	Reviewer	Sep 2023	IEEE NMITCON Conference

EXPERT LECTURES
Coordinators : Prof. Divya Sharma

Name of the Industrial Expert	Company Organization	Topic/ Subject	Semester	Hours engaged	Date
Mr. Sagar Somashekar,	Nokia Solutions, Bangalore	OFDM for Wireless Communication	VII	2	10/11/2023

ALUMNI TALK
Coordinators: Prof. Ishani Mishra

Name of the Alumni and Current Designation	Date of the Event	Contribution
Mr. Naveen K Max) H **(Year of Graduation- 2019)** **Physical Design Engineer** **Soctronics Pvt Ltd**	**08/01/2024**	**VLSI-IC Design Flow and Timing Analysis**
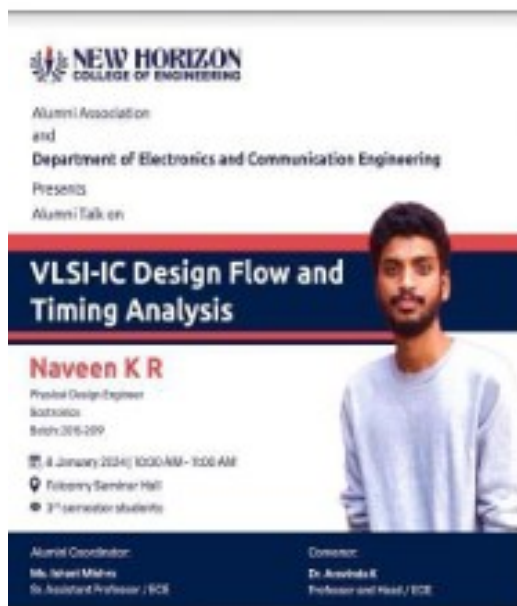
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WORKSHOPS:
Coordinator : Prof Salna Joy

Date	Resource person	Title	Semester
22/11/2023	Mr. Harish	Workshop on "Global Awareness Education & GRE"	III
15-12-2023	Vikram Singh and Karthikeyan Sundaram;	WORKSHOP ON 5G TEECHNOLOGIES	V
08-11-2023	Dr.Balu Vura	Entrepreneurship and innovation as career opportunity	VII

TECHNOLOGY SHARING CLUB
(COORDINATORS : PROF. S. BHATTACHARYA , PROF. ISHITA DEB)

What we're about:

We as a club will provide the right platform to develop your thoughts to innovations which will suffice the need of the hour. Also gives you sorted insight on technology be it former or newfound. An open forum will also be provided for discussions. Lack of Knowledge often leads to mishaps, here at our club we aim to prevent any such mishaps by enhancing your knowledge through fun-learning. We will also provide adequate opportunities for you to share technical thoughts and technical symposiums.

Objective:

To provide insight into existing and evolving technology and product

ROLE	NAME
President	R Vikas
Vice-president	Nandana P
Secretary	Akshaya Srinivasan
Treasurer	Shiva Shankar L
Committee Member	Nandana P
Committee Member	Chandan Gowda M
Committee Member	Karthik S
Committee Member	Nithya Bharadwaj
Committee Member	M Manasa
Committee Member	Chetas E Achar
Committee Member	Snehal

ELECTRONICS HOBBY CLUB
(COORDINATORS : PROF. RICHARD , PROF. AMARJEET PAL)

What we're about:

The goal of this club is to implement and demonstrate electronics-based hobby projects and products. By motivating the enthusiasts in trying out the avenues of hardware and software domains of the electronics and communication, this club is aimed at enriching the intelligence as well as wisdom of the technical community.

The Club aims to cater to the various needs to keep in pace with the ever evolving field of electronics Innovation, Imagination and Application is the motto of the club. We aim to provide a platform for the students to showcase their innovative ideas. The Club deals from basics of electronics till the latest developments The Ideas learnt in theory classes can be applied in the real world.

Objective:

To implement and demonstrate electronics-based hobby projects andproducts.

Role	Name
President	Rohit P
Vice-president	Tanushree Aravind Kumbhare
Secretary	Praveen Kumar N
Treasurer	J Dhanush
Committee Member	Vishwas
Committee Member	Lokesh Biswas
Committee Member	Siva S
Committee Member	Pratheek KV
Committee Member	Santhosh Kumar
Committee Member	Likitha R
Committee Member	Rohith

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ELECTRONICS HOBBY CLUB

EVENT	DATE	DESCRIPTION
CODE CRAFT	14/12/23	To improve coding skills

PROFESSIONAL CONNECT CLUB
(COORDINATORS : DR. GURULAKSHMI , PROF. DIVYA SHARMA)

What we're about:

We help you connect with professionals, professional bodies, research organizations and companies.

We organize guest lectures, seminars, workshops, conferences and competition on technologies, projects and products.

We organize field trips to companies, research institutions and industry exhibitions. We help to facilitate active participation in external technical events.

Objective:

To connect with engineering professionals and conduct tech-

ROLE	NAME
President	Sahana Kulkarni
Vice-president	Venkata Bhavana Boggarapu
Secretary	Jayanth S
Treasurer	Abhijeeth Talari
Committee Member	Y Chitra
Committee Member	Rohanth Hari M
Committee Member	Deepak Yadav
Committee Member	Mohammed Hesham Umar
Committee Member	N Shashank Gowda
Committee Member	Deepthi L
Committee Member	Kriti Sujai Kumar Devatha

THE ROCKETRY CLUB
(COORDINATORS : PROF. LIPSA DASH)

What we're about:

Everything begins with an idea and every great idea starts with a spark. Such a spark was to fuse the concepts of aerospace technology with the generic curriculum that gave rise to a student club of its kind, the NEW HORIZON ROCKETRY CLUB, a multidisciplinary workspace for inquisitive minds to brainstorm, collaborate and execute the potential ideas in the field of aerospace technology. The club focuses on gaining knowledge and skills through team projects and works on enhancing these acquired skills by conducting events and workshops for one's peers thereby instigating curiosity in them too. The club intends on creating an open ground for all students to share knowledge and grow together outside the classrooms.

Objective:

To demonstrate and implement the concepts of Aerospace Technology

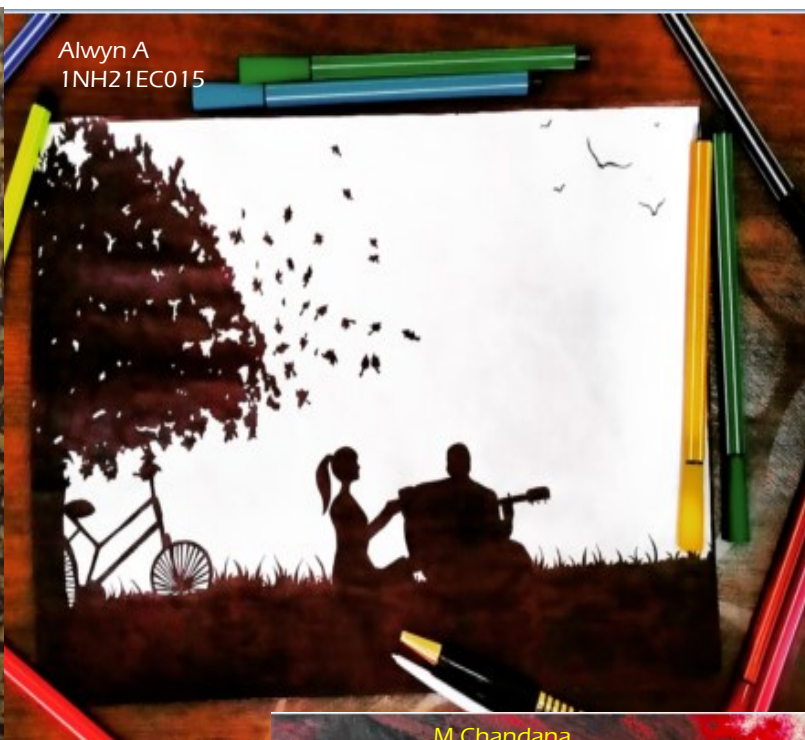| ROLE	NAME
President	Bharatdeep Hazarika
Vice-president	Bhargav Dayal
Secretary	Ananya Sundar
Treasurer	Ayush Bansal
Committee Member	Rithesh B
Committee Member	Sumanth K B
Committee Member	Avneesh Tamra
Committee Member	Abhishek Bedant
Committee Member	Sai Kiran
Committee Member	Mohd Adnan Khan
Committee Member	B Akhil

PLACEMENTS
(COORDINATORS : PROF. SABITABRATA BHATTACHARYA)

S.N	Name of the Organization	No of students placed	Salary Offered
1	Allstate Solutions Pvt Limited	3	₹5.50L
2	Computacenter (India) Pvt. Ltd.	6	₹6.75L
3	Cubic Logics	1	₹5.38L
4	DXC TECHNOLOGY	14	₹4.50L
5	Eurofins IT Solutions	2	₹12.75L
6	EXL Service	11	₹4.00L
7	Genpact	2	₹8.00L
8	Infosys	1	
9	ITC Infotech Ltd	3	₹4.25L
10	Juniper Networks	2	
11	Light & Wonder	3	₹8.76L
12	Microland	2	₹4.00L
13	Smartsoc solutions	1	₹6.00L
14	Societe Generale	3	₹6.62L
15	Transcaal Power Division India Pvt Ltd	6	₹2.25L
16	Tricon Infotech Pvt Limited	4	₹5.50L
17	Visionet System Inc	4	₹4.25L
	Total No of students placed	**68**	
	Total No of offers	**68**	

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STUDENT CORNER—*A GLIMPSE TO THE CREATIVITY OF STUDENTS*

Kriti S Devatha
1NH21EC079

Alwyn A
1NH21EC015

M Chandana
1NH21EC084

Kriti S Devatha
1NH21EC079
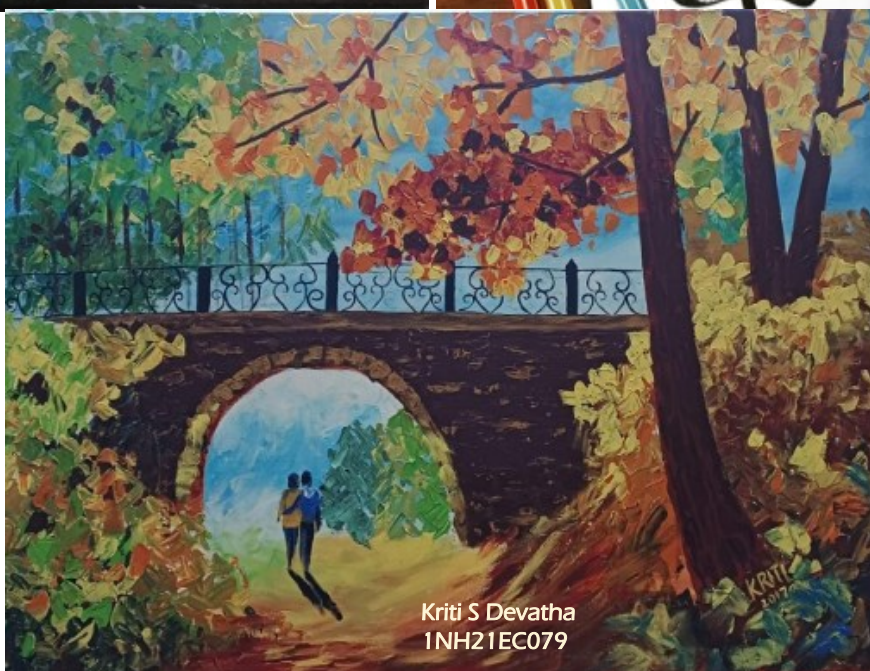
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STUDENT CORNER—*A GLIMPSE TO THE CREATIVITY OF STUDENTS*

C Yashvitha
1NH21EC034

Alwyn A
1NH21EC015

Kriti S Devatha
1NH21EC079

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision

To create high quality engineering professionals who can serve the society and earn global recognition.

Mission

 To build strong foundation in Electronics and Communication Engineering aspects by exposing students to state of the art technology and research

 To strengthen the curriculum through interaction with industry experts and to equip the students with the required competency.

 To mould students to share technical knowledge and to practice professional and moral values.

Program Educational Objectives

PEO 1: To produce graduates with understanding of fundamentals and applications of Electronics and Communication Engineering.

PEO 2: To hone graduates with ability to apply, analyze, design and develop electronic systems.

PEO 3: To enhance graduates with latest technologies to enable them to engineer products for real world problems in Electronics and Communication.

PEO 4: To build leadership qualities, management skills, communication skills, moral values, team spirit and lifelong learning ability for the graduates.

PROGRAM OUTCOMES

B. E graduate should possess the following Program Outcomes-

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems in Electronics and Communication Engineering.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems in Electronics and Communication Engineering reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes of Electronics and Communication Engineering that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments in Electronics and Communication Engineering, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities in Electronics and Communication Engineering with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice in Electronics and Communication Engineering.

Environment and sustainability: Understand the impact of the professional engineering solutions of Electronics and Communication Engineering in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAM SPECIFIC OUTCOMES

Program Specific Outcomes	
PSO1	To demonstrate the ability to design and develop complex systems in the areas of next generation Communication Systems, IoT based Embedded Systems, Advanced Signal and Image Processing, latest Semiconductor technologies, RF and Power Systems
PSO2	To demonstrate the ability to solve complex Electronics and Communication Engineering problems using latest hardware and software tools along with analytical skills to contribute to useful, frugal and eco-friendly solutions.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

Today the world has shrunk and the global village is marching towards technological revolution predominantly due to innovations in the field of Electronics and Communication. The field of Electronics and Communication opens the doors to a myriad of opportunities and exciting challenges for the go-getters.

The department of electronics & communication engineering is accredited by the National Board of Accreditation (NBA). The vision of the department is to create high quality engineering professionals who can transform society and earn global recognition.

http://newhorizonindia.edu/nhengineering/department-of-electronics-and-communication-engineering/

The department is bestowed with well designed and well maintained infrastructure. It is well equipped with interactive classrooms and laboratories with latest equipment for students to experiment and state of the art facilities. The department also offers the VTU research centre for Ph.D. and M.Sc. (Engg.), for research.The enthusiastic teaching fraternity of the department besides being highly qualified, have the acumen to instil in students the urge to do better and bring out the best in them. Most of them have considerable experience in academics and research as.Few of them have industrial experience as well.The Electronics & Communication Engineering Program with its autonomous status is re-designed to cater to the needs of industry. The courses focus on intriguing areas like Embedded Systems, Communication, VLSI, Signal Processing, and Information technologies. Industry-relevant technology courses are a feather on the cap in the department.To run the same technology experts from reputed organization like IBM, HP, Texas Instruments, Sankalp Semiconductors, Audience Communication, Intel, ISRO, IISc. and other reputed institutes visit the department. The interaction of students with the experts gives them a niche over their peers in a world where technological growth and development is fast pacing and prepares them to chalk out solutions for the real world problems.To keep them updated on the technological scale, various workshops, seminars, competitive events, conferences and industrial visits are also organized on a regular basis.

To give them practical exposure and develop their technical and interpersonal skills the students of ECE department are required to execute various projects throughout their studies. Also they're motivated to publish research papers, and participate in national and international conferences as well. They take the lead in planning and executing various activities through Electronics Hobby Club, Technology Sharing Club, and Professional Connect club which definitely gives them an enthralling experience. Furthermore the students also undergo special placement training through value added programs. Most of them get placed in reputed organizations such as Intel, Texas Instruments, AMD, Qualcomm, ARM, Schneider Electric, Bosch, Cisco Systems, Juniper Networks, Vmware, Sony, Nokia, Accenture, Cap Gemini, IBM, HP, TCS, Infosys, Wipro, Mindtree and many more. Some students pursue higher studies in Indian and foreign universities, while there are quite a few of them who start their own ventures thereby contributing immensely in the growth of our society. As the famous quote goes "All work and no play makes Jack a dull boy. Students also engage themselves in cultural, sports and social activities. Many have taken it one step ahead and won gold medals and several trophies in sports and cultural events organized at different levels and several other institutions.Overall, the department provides a very positive and nurturing environment, for students to develop and grow into into knowledgeable, skilled and productive Electronics & Communication Engineers.