Bit – X
JULY 2024
Bits & Bytes

Bits & Bytes

EC NEWSLETTER

Ocean Of Career Opportunity in Electronics & Communication

Ocean Of Career Opportunity in Electronics & Communication

VISION

To impart excellent technical education for developing ethically sound and globally competent skills to girls opting for engineering as a career in the revolutionizing era of electronics and communication.

MISSION

- **To provide a creative environment for innovation in the field of Electronics & Communication through structured teaching learning process.**
- **To create a platform for effective interaction between Industry and Institute.**
- **To contribute to societal needs through innovation.**
- **To inculcate a self-learning attitude, environment skills and professional ethics among students so as to enable them to contribute for sustainability of environment and serve the society.**

ELECTRONICS AND COMMUNICATION ENGINEERING DEPARTMENT

GOVERNMENT POLYTECHNIC FOR GIRLS
OPP. PRL, GUJARAT UNIVERSITY ROAD, NAVARANGPURA, AHMEDABAD – 380 015

या कुन्देन्दुतुषारहारधवला या शुभ्रवस्त्रावृताया
वीणावरदण्डमण्डितकरा या श्वेतपद्मासना।
या ब्रह्माच्युत शंकरप्रभृतिभि र्देवैः सदा वन्दिता
सा मां पातु सरस्वती भगवती निःशेषजाड्यापहा ॥1॥

जो विद्या की देवी भगवती सरस्वती कुन्द के
फूल, चंद्रमा, हिमराशि और मोती के हार की तरह
धवल वर्ण की हैं और जो श्वेत वस्त्र धारण करती हैं,
जिनके हाथ में वीणादण्ड शोभायमान है,
जिन्होंने श्वेत कमलों पर आसन ग्रहण किया
है तथा ब्रह्मा, विष्णु एवं शंकर आदि देवताओं
द्वारा जो सदा पूजित हैं, वही संपूरण जड़ता
और अज्ञान को दूर कर देने वाली
माँ सरस्वती हमारी रक्षा करें॥1॥

Acknowledgment

Electronics and Communication Engineering Department of Government Polytechnic for Girls, Ahmedabad feels thrilled to present its genuine stakeholders "Bits & Bytes" a semester newsletter. This newsletter "Bits & Bytes" started with an objective of knowledge sharing and spreading divergent activities of Electronics and Communication Engineering Department. We would also like to focus on new developments in Electronics and Communication field, latest ongoing and upcoming trends and events, previous month's news and events.

We consider, a newsletter "Bits & Bytes" as a best place to appreciate the students, faculty members and stake holders for their achievements. We hope, this newsletter provides necessary motivation to the stake holders as well as also very much helpful to update our knowledge of fast growing Electronics and Communication field.

Finally, we would like to expand our deepest gratitude to all members who directly or indirectly involved and give their valuable support for making this newsletter "Bits & Bytes". We know that without grace of all mighty GOD this thing is not possible. So, here by we present the first Bit (Volume) of "Bits & Bytes".

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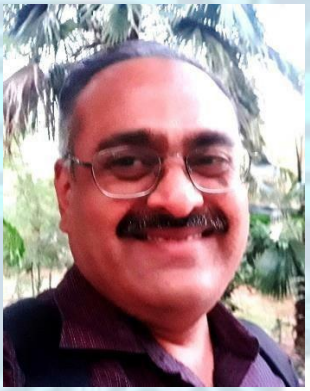
Message from Principal's Desk



Prof. Bhasker J. Iyer

"Technology is the Gift of God. After the gift of life, it is perhaps the greatest God's gifts. It is the mother of civilization, of arts and of sciences."

-Freeman Dyson

Government Polytechnic for Girls - Ahmedabad (GPGA), a premier diploma engineering institute was established in the year 1968 with the aim to provide technical education to girls in the heritage city of Ahmedabad. It is located right opposite to PRL and adjacent to ATIRA, in the throbbing educational hub within the heart of the city and in the vicinity of reputed institutes like L.D.College of Engg., Gujarat University, L.M.College of Pharmacy and the world renowned CEPT University. It is endowed with a beautiful green campus which has its own flora and fauna.

At present, GPGA offers 3-year diplomas in 6 programmes under Commissionerate of Technical Education and is affiliated with Gujarat Technological University (GTU). These are Diplomas in Architecture Assistantship (DAA), Biomedical Engineering (DBE), Computer Aided Costume Design and Dress Making (DCACDDM), Civil Engineering (DCE), Computer Engineering (DCoE), Electronics and Communication Engineering (DEC) and Information Technology Engineering (ITE).

GPGA has a tradition of imparting quality technical knowledge and ethical values to the students. No wonder GPGA is ranked among top 10 government diploma engineering colleges in Gujarat consistently over the last five years.

For years, the institute's major focus and concern have been our students and our institution strives to impart the best knowledge in respective fields for promoting and pursuing multidisciplinary diploma engineering in the most disciplined manner. Every student of the

institute has been among some of the best talents of the vibrant state of Gujarat. Many of GPGA's alumnae have established themselves as entrepreneurs while some have continued higher studies with well-known engineering institutes of India as well as abroad. Thus, they have carved a niche for themselves in various technical fields throughout the state, our nation and even abroad.

The institute has an excellent track record of placements in past few years and students of GPGA have proved their mettle in industry, academics, and administration over the last many years. This glory has been due to the synergetic efforts of management, learned faculty, dedicated staff and sincere students over these years. I urge everyone, including staff and students, to make excellent careers by availing the unique opportunity that GPGA provides through classroom teaching, laboratory instructions, industrial trainings and participation in sports, cultural and other extra-curricular activities of interest. Recently, formation of GPGA's Alumnae Association has also been undertaken.

During the current academic year, three programmed of GPGA i.e. DCACDDM, DCE and DCoE have initiated the process of application for Accreditation with NBA. For the faculty and administrators, accreditation promotes ongoing self-evaluation and continuous improvement and provides an effective system for accountability. For the institute or programme, accreditation enhances its national reputation and represents peer recognition. Thus to further the institute's aim towards excellence, accreditation process has been undertaken. I extend my best wishes to all staff members and students of these programmes for getting accredited in the year 2021.

I express my sincere gratitude to all our stakeholders for their continued support, cooperation and active involvement to make GPGA a citadel of Technical Learning, which sets its own benchmark.

Message from HOD's Desk

Prof. T. P. Chanpura

Dear Readers,

It gives me great pleasure to present you this 10th Bit (Volume 10) of July 2024.

From 7G technology to neuromorphic computing, the future holds limitless opportunities for innovation and discovery. As technological advancements accelerate, we remain committed to equipping our students with the skills and knowledge needed to thrive in this ever-evolving landscape.

Our flagship competitions, TechnoSarita and Technospring, continue to serve as platforms for creativity, problem-solving, and groundbreaking ideas. These events not only inspire innovation but also nurture the next generation of engineers, researchers, and entrepreneurs who will shape the future.

A big thank you to K.N. Chaudhari, M.R. Panchal, and all our esteemed faculty members for their dedication and hard work in fostering an environment of excellence. Your unwavering commitment to academic rigor, research, and student mentorship plays a pivotal role in our success.

A special acknowledgment to N.B. Nadoda for his continued contributions to society and technological advancement. Your efforts exemplify the spirit of innovation with purpose, inspiring students and faculty alike.

To our graduates—aim high, break barriers, and make an impact! The future is yours to shape, and we have no doubt that you will lead the way in driving technological transformation.

SPACE AND SCIENCE TECHNOLOGY

India's space exploration journey has reached new heights in recent years, with significant achievements in 2023 paving the way for even more ambitious plans in 2024. India celebrated the successful launch of Chandrayaan-3, the third mission in its lunar exploration program on 14th July 2023. This mission aimed to further our understanding of the Moon's surface and geology, following the footsteps of its predecessors, Chandrayaan-1 and Chandrayaan-2. Chandrayaan-3's success bolstered India's reputation as a formidable player in space exploration, showcasing its technological prowess and scientific capabilities.

Additionally, India also launched Aditya-L1, its first dedicated mission to study the Sun on 2nd September 2023, and successfully achieved its intended orbit nearly an hour later. The Aditya-L1 spacecraft is equipped with state-of-the-art instruments to observe solar phenomena, study the Sun's corona, and investigate solar wind dynamics. This mission holds immense scientific importance, contributing to our understanding of space weather and its impact on Earth's environment and technology.

Building on this success, India is gearing up for a series of groundbreaking space missions in 2024. One of the most anticipated missions is Gaganyaan, India's first manned space mission. Scheduled for launch in late 2024 or early 2025, Gaganyaan will see Indian astronauts venturing into space aboard the Gaganyaan spacecraft. This historic mission marks a significant milestone for India's space program, positioning it among the elite group of nations with human spaceflight capabilities.

Furthermore, India's space agency, ISRO (Indian Space Research Organisation), is actively collaborating with international partners on various space exploration projects. These collaborations not only enhance India's capabilities but also foster global cooperation in advancing space science and exploration.

As India embarks on this new era of space exploration, the country's achievements and planned missions underscore its commitment to pushing boundaries, driving innovation, and contributing to humanity's collective quest for knowledge and exploration beyond Earth's confines. With each successful mission, India reaffirms its position as a leading player in the global space community, inspiring future generations to dream big and reach for the stars.

Pursuing aeronautical & aerospace engineering programs at KCG Tech opens up a world of opportunities for students passionate about space exploration and aviation technology. With a curriculum designed to foster innovation, hands-on experience, and industry-relevant skills, students gain a solid foundation to thrive in the dynamic field of aerospace engineering. Our institute's state-of-the-art facilities, experienced faculty, and industry collaborations provide an immersive learning environment that prepares students for exciting careers in space agencies, aerospace companies, research institutions, and more. By choosing these programs, students not only contribute to India's growing presence in space exploration but also become part of a global community dedicated to pushing the boundaries of human knowledge and exploration

. 10 New Space Technology Trends & Innovations in 2025

1. Small Satellites:

Small satellites have become a leading trend in SpaceTech, especially in 2025. Their miniaturization allows for cost-effective designs, and advancements in industrial technology enable mass production. Startups are developing small satellites that perform tasks typically challenging for larger satellites. These include proprietary wireless communications networks, scientific observation, data gathering, and Earth monitoring using GPS.

2. Advanced Space Manufacturing:

Space manufacturing is embracing cutting-edge technologies like advanced robotics, 3D printing, and light-based manufacturing to enhance space products and services. These innovations are driving the development of large space structures, reusable launch vehicles, space shuttles, and advanced satellite sensors. Automation plays a crucial role in the space industry, particularly for long-term exploration and missions. Consequently, startups are offering solutions specifically designed for the space industry's needs.

3.Novel Space Communication Systems:

Novel space communication systems are a significant trend in the SpaceTech industry, focusing on advanced methods for transmitting and receiving data in space. The use of laser communication relay systems offers faster data rates and more secure communication compared to traditional radio frequency systems. Whereas, quantum key distribution (QKD) in space provides ultra-secure communication channels by using quantum mechanics principles.

4. Space Traffic Management:

The increasing number of satellites and space debris in Earth's orbit calls for improved space traffic management. Advanced satellite tracking systems employ radar and optical sensors to actively monitor and predict potential collisions.
Automated collision avoidance systems represent another development, autonomously adjusting satellite orbits based on algorithmic threat analysis. Furthermore, the establishment of international regulatory frameworks standardizes space operations, ensuring safe and sustainable space utilization and preventing orbital congestion.

5. Smart Propulsion:

Smart propulsion systems are a key trend in the SpaceTech industry, offering innovative solutions for space travel. Examples include electric propulsion systems, which use electrical energy to accelerate propellant at high speeds, and green propulsion systems, utilizing environmentally friendly fuels like hydrogen and oxygen.

6. Space Activity Management:

The increasing number of space missions demands efficient coordination of various space missions and activities. As a result, startups are offering advanced space activity management solutions. The development of advanced mission control software enables real-time monitoring and management of spacecraft and satellites. The use of AI-driven analytics for predicting and

mitigating potential orbital conflicts enhances the safety of space operations.

7. Space Missions:

Space exploration addresses the fundamental questions about our universe and the history of our solar system. By addressing the challenges related to space exploration, humans find opportunities to advance mining, material science, and life science research. Utilization of reusable rockets significantly reduces the cost and increases the frequency of space missions.

8. Space Mining:

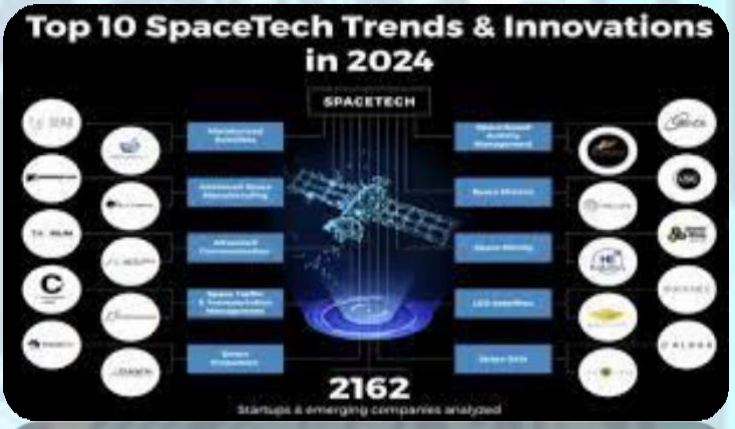
The mining of celestial bodies is shifting from science-fiction (Sci-Fi) to reality. Robotic mining equipment designed for extreme space environments is capable of autonomously drilling and extracting resources. Another significant development is the use of spacecraft equipped with advanced sensors and AI to identify and analyze resource-rich asteroids.

9. Low-Earth Orbit Satellites:

A low-earth orbit (LEO) is relatively close to Earth's surface and is normally at an altitude of less than 1000 km but could be as low as 160 km above Earth. Also, LEO satellites do not always follow a particular path around Earth. This means that there are more routes for satellites in the LEO. This makes it a feasible target for space companies. To this end, startups develop relevant solutions and techniques to deal with LEO-related challenges.

10. Space Data:

LEO satellites and multi-satellite constellations are increasingly in use for communication, spying, earth monitoring, and other imaging applications. With large volumes of data from these satellites, there is a need to process, treat, analyze, and manage the information. SpaceTech startups are utilizing AI to intelligently analyze satellite data, enabling faster and more accurate interpretation of vast information streams from space.



Quantum Computing

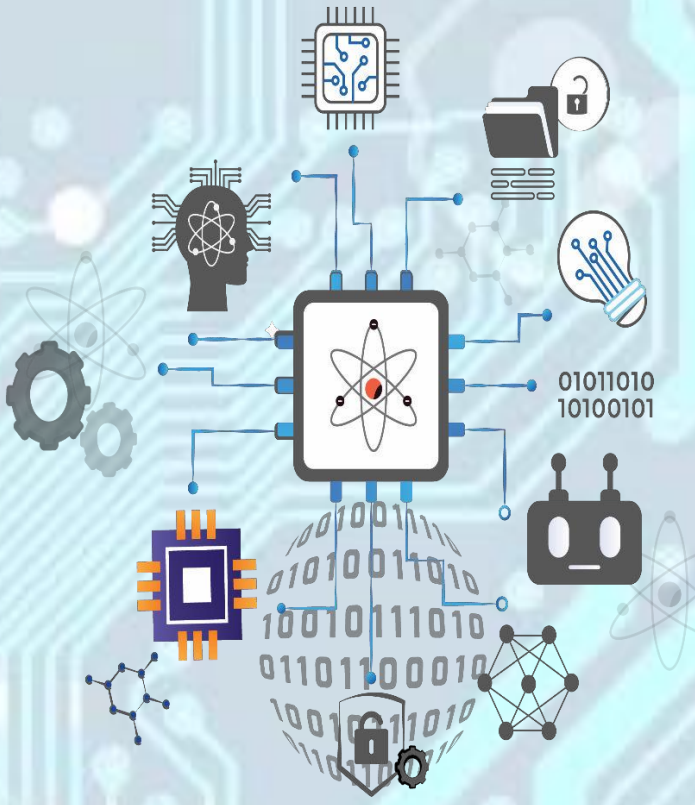
India has the second highest open access quantum computing users in the world after the US, at about 77,000, said Jay Gambetta, vice president of IBM Quantum.

Immense opportunities for the Indian industry to become pioneers in quantum computing in high priority use cases such as "sustainability, energy, green hydrogen, efficiency of CO2 recapture process or nitrogen in agricultural yield and logistics, among others".

The Union cabinet approved the NQM in April last year with an outlay of Rs 6,003.65 crore from 2023-24 to 2030-31, aiming to seed, nurture and scale up scientific and industrial R&D in quantum technology. This is expected to accelerate quantum technology-led economic growth, nurture the ecosystem in the country and make India one of the leading nations in the development of quantum technologies and applications.

"India has invested heavily in quantum computing, and that investment has paid off. It is rapidly emerging as a global quantum computing leader," Gambetta said. "Our local quantum experts collaborate widely with Indian universities on research and education,supporting undergraduate, postgraduate and faculty development programmes."

As part of that work, IBM Quantum has provided the equivalent of $14 million (about Rs 116.82 crore) in quantum computing credits to Indian users to date, he said.



NON-TECHNICAL EVENTS:

Sports Day Celebration :

It is said that education is incomplete without sports. Sports help in overall development of students.

Department of Electronics and Communication, Government Polytechnic For Girls, Ahmedabad celebrated Sports Day on 22nd and 23rd February with Great enthusiasm. The students and faculties of Electronics & Communication Engineering Department actively participated in various sports games like Kho -Kho, Cricket, Chess, Badminton etc. and enjoy the event.

Yoga Day Celebration:

1. Event Overview
   - Event Name: International Yoga Day Celebration 2024
   - Date: June 21, 2024
   - Location: GGP, Ahmedabad
   - Theme: "Unity and Wellness"]
2. Objectives
   - Promote awareness and practice of yoga.
   - Foster community engagement and well-being.
   - Educate participants about the benefits and history of yoga.

Health On Plate Competition:

Every year the Gymkhana committee organizes food festival on campus.
This time the theme was “Health on Plate”
was organized on 11th January 2023. The theme of the food festival was on nutritive food.
The food festival included competition as well as food stalls. The students of our institute were encouraged to take part either in the competition and come up with
new creative ideas on nutritive food as well as install food stalls to cater to the taste pallets of the audience.

Navratri Celebration:

Navratri is celebrated every year in Navratri. Students all departments participated in garba competition followed by “Gopi Raas” in campus. Announcing the winners of the Garba competition after an intense competition.
The Garba spirit is alive, and we look forward to another successful competition in the future.

Ink & Imagination:

To celebrate Women’s Day , students have participate in wall painting initiative on 6th March.

TECHNICAL EVENTS:

Embedded System Workshop:

On 15th May ,2024 our college has organized a workshop for 4th and 2nd semester students of EC department on embedded system which was follow up by Alpha tech Automation Company.

We have studied about microcontroller and their different types also their applications.

Further we have study about PCB Design The workshop was aimed to provide knowledge about simulation tool to test electronics & electrical circuit in software environment, PCB design software named Cad soft EAGLE.

Industrial Visit On PCB Manufacture & Components Mounting:

An industrial visit for Electronics and Communication students is a great way to bridge the gap between theoretical knowledge and practical application. Such visits can provide students with hands-on experience, insights into industry practices, and exposure to advanced technologies used in the field.

On 30th April students of EC department along with department Faculty visited 2 PCB Design & Manufacture Company to gain knowledge and to understand how components are mount on PCB.

Firstly , we visit Dutt Electronics in Gandhinagar is primarily known for its retail and consumer electronics services. At there we learn about Schematic Design Creating the electrical schematic diagrams that define the circuit functionality. PCB Layout for Designing the physical layout of the PCB, including component placement and routing of electrical traces.
Utilizing software such as Eagle, Altium Designer, or KiCad for creating PCB designs. Running simulations to ensure the design meets electrical and mechanical requirements.

Secondly , we visit Electro EMS in Gandhinagar is known for its PCB (Printed Circuit Board) manufacturing services. We learned about Types of PCBs, Manufacturing various types of PCBs, such as single-sided, double-sided, and multi-layer boards. And also Using different materials such as FR-4, CEM1, and flexible substrates depending on the application.
Also how components are placed in the PCBs ,Soldering electronic components onto PCBs using techniques like SMT (Surface Mount Technology) and THT (Through-Hole Technology).

Extra Curricular:

Science City & Awareness:

On 2nd March , Students of GGP Ahmedabad visited Science City for Science Carnival 2024.

We had attend the seminar on Cervical Cancer where the speaker was Dr. Mitali Vasavada . She is known for her expertise in the treatment and management of cancers affecting the female reproductive system, including cervical cancer, ovarian cancer, and endometrial cancer.

Cervical cancer originates in the cells of the cervix, the lower part of the uterus that connects to the vagina. It is primarily caused by persistent infection with high-risk types of human papillomavirus (HPV). While many HPV infections resolve on their own, persistent infection with certain HPV strains can lead to abnormal cell changes and, eventually, cancer.

TECHNO SARITA 2024

The Department of Electronics and Communication conducted its Techno Sarita on April 26, 2024. Poster presentations and demo Models of various projects were displayed in the exhibition . The major objective of organizing this exhibition was to provide the platform and unleash the potential of the students by showcasing their innovative projects developed either focusing Industry Defined Problems or User Defined Problems and provide an opportunity for the students to demonstrate their learning experience.

The outcome of the project was that students could successfully complete their projects under the guidance of faculty and were able to show their project at an extraordinary level and this process boosted their confidence.

Prof. T. P. CHANPURA , Professor & Head, Department of Electronics & Communication engineering being invited in the presence of Dr. B. B. SONEJI ,Faculty members and Students along with Academic expert , Prof. H.D.PANCHAL ,Lecturer, EC DEPARTMENT,GOVERNMENT POLYTECHNIC AHMEDABAD.

The Program was visited by the staff and students of various departments. Prof. H. D. PANCHAL as an External Jury visited all the batches and analysed them for ascertaining the winners based on several criteria. Dr. B.B.SONEJI , Principal of our institution visited the exhibition and heard from all the batches. He motivated the students on taking the projects to next level. Based on various criteria of evaluation by the External Jury, The list of Prize winners are as follows,

1.Samdhiya Snehal Pravinkumar

2.Patel Ekta Chetankumar

3.Pise Madhuri

VISION

To carve a brighter prospect for the nation through excellence in technical education for fostering skills, ethical values and environmental consciousness among girl students while undertaking existing and forthcoming challenges.

MISSION

- **To nurture technical and creative skills through quality education.**
- **To strengthen industries interaction.**
- **To impart real life problem solving skills.**
- **To foster care for sustainability of environment and importance of social responsibility among girl students.**

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