

# Gist of YOJANA

June 2022



## New-Age Tech

Decoding Modern Digital Terms

Digital Disruptor

Deep-tech Startup Ecosystem

AI in Education

NFT Explained

## Gist of Yojana June 2022: New Age Tech

### TABLE OF CONTENTS

1. <a href="#">Decoding Modern Digital Terms</a>
2. <a href="#">Digital Disruptor</a>
3. <a href="#">Deep-Tech Startup Ecosystem</a>
4. <a href="#">Artificial Intelligence (AI) And Machine Learning (ML)</a>
5. <a href="#">AI in Education</a>
6. <a href="#">NFT Explained</a>
7. <a href="#">Tech-Innovation in Banking</a>
8. <a href="#">Advancements in Medicine</a>

## Chapter 1: Decoding Modern Digital Terms

### Blockchain

- Blockchain refers to a system whereby information about transactions is stored on countless computers spread across the world.
- It is considered an alternative to the conventional banking system.
- In Blockchain, transfers of money or transactions are recorded on computers worldwide, and this system has nothing to do with the banks.
- Along with banks, this model is also applicable to mobile payment systems.
- The information stored under the Blockchain is said to be more secure than a conventional banking system as countless copies of the transactions are kept on computers around the world and it is virtually impossible for someone to hack so many computers.
- The [cryptocurrencies](#) which are in the news in recent times work on this principle of the Blockchain system.

Read about - [National Strategy on Blockchain](#)

### Non-Fungible Tokens or NFTs

- The success of blockchain as an independent means of storing and authenticating information has given rise to many more innovations, one of which is the Non-Fungible Token, or NFT.
- Here, the information is stored on the blockchain system itself, especially in a system called Ethereum.
- Under an NFT system, a digital certificate is issued to prove the ownership of an item which is of historical importance, or memorabilia or something that is unique in the entire world.
- This digital certificate cannot be tampered with.
- The ownership of an NFT is recorded in the blockchain and can be transferred by the owner, allowing NFTs to be sold and traded.
- NFTs can be associated with physical assets and virtual or digital assets.

### Metaverse

- Metaverse means a parallel universe present in the digital world that contains most of the things that exist in our physical world.
- Accessing this virtual world requires the Internet and digital devices.
- Metaverse is similar to a video game which is expanded widely and several people can access it digitally.
- Metaverse will include activities such as events, business, entertainment, meetings, etc.
- People will be present in the Metaverse through virtual, digital avatars.

- Corporate giants such as Microsoft, Meta (Facebook), Decentraland, Nvidia, and Unity are engaged in making it a reality.

### **Internet of Things (IoT)**

- The [Internet of Things](#) refers to connecting various things of the world to the internet.
- IoT forms the network of physical objects i.e. things, enclosed with sensors, software, and other technologies for the purpose of connecting and exchanging data over the internet.
- These devices include day-to-day objects as well as complex industrial tools such as various household appliances, cars, etc. which are connected to the internet via embedded devices and seamless communication.
- Minimal human intervention allows data to be shared and collected through the use of low-cost computing, the cloud, big data, analytics, and mobile technologies.
- IoT can be put into three categories where
  - The information is collected and sent.
  - The information is received and acted upon.
  - Performing both simultaneously.

### **Quantum Computing**

- The [Quantum Computer](#) has attracted a lot of discussion due to its infinite power.
- A quantum computer can perform calculations millions of times faster than a normal computer.
  - Some regard this ability of the computer as a boon for humanity, but critics point out that it can also give rise to new challenges.
- Traditional computers work based on a fundamental unit of binary digits (0 and 1) called 'bit'. However, the Quantum computer adopts Qubit or Quantum Bit.
  - While the bit value can be 0 or 1 only, the Qubit value can be 0,1, or both.
- Transistors are used in traditional computers. But, atoms, electrons, ions, photons, etc., are used in quantum computers which can be superimposed on each other.
- At present, very few quantum computers have been developed in the world.
  - The world's first quantum computer was built in 1997.
  - In 2007, a company named D-Wave Systems of Canada introduced a powerful 28-qubit quantum computer.
  - Currently, Rigetti's quantum computer is considered the most powerful, with a capacity of 128 qubits.

### **Artificial Intelligence (AI)**

- Artificial intelligence (AI) refers to the ability of machines (or technology) to learn, analyse, think, understand, solve problems, make decisions, etc., similar to a human being.

- AI is expected to bring about changes in the world and has the potential to change the way we live, work, read and write, travel, run industry, and get medical treatment.
- Machines that are equipped with [AI](#) are expected to become powerful and 'intelligent' and compete with human beings' capabilities.
- AI has already been used in day-to-day life through features like machine translation and voice-to-text conversion.

## Cloud Computing

- Cloud computing implies the use of the resources available on the Internet on computers or other smart devices.
- Cloud computing has facilitated vast computational power and ensured that vast storage space is available to make use of technologies such as AI.
- These are also called virtual machines as they are present in the virtual form, but not in physical form.
- The use of such infrastructure or infrastructural facilities remotely through the internet is called **Infrastructure as a Service (IaaS)**. It is one of the three major categories of cloud computing.
- The other two categories include:
  - **Software as a Service (SaaS)** - the service that is used through the cloud for some time without buying software like Photoshop, Microsoft Word, or AutoCAD.
  - **Platform as a Service (PaaS)** - refers to technology platforms that are used to develop software and manage them, providing them to others for use.

## Chapter 2: Digital Disruptor

### Applications of various digital technologies

- **Artificial Intelligence (AI) and Machine Learning (ML):** AI and ML have unlocked opportunities to complement human intelligence and combat socio-economic issues.
- **Quantum Computing:** Applications in secure communication; disaster management in terms of better prediction; computing; chemistry, healthcare, cryptography, imaging, etc.
- **Semiconductor Technologies including Semiconductor Nanotechnology:** Eliminating the boundary between the digital and physical worlds have provided a major impetus to the hardware industry.
- **Smart Manufacturing:** Use of Internet of Things (IoT), Blockchain, Big data Analytics, AI and Robotics as a part of Industry 4.0 and the commercial use of additive manufacturing (i.e. 3D printing).

- **Smart Mobility:** Use of IoT and AI/ML in new-age transportation and logistics solutions which includes autonomous and remotely piloted vehicles, vehicles powered by renewable and clean fuels.
- **Advanced Communication Technologies and its Security:** Adoption of 5G, Cloud computing, and penetration of broadband internet to remote areas have opened new avenues such as Tele-health.
  - Advancements in [cyber security](#) and the hardening of communication systems are also expected to stay apace with the communication and networked technologies.
- **Space Technologies:** Advancements in technologies have resulted in the outcome of Satellite-Based Quantum Communication, Quantum Radar, Self-Eating-Rockets, Self-Vanishing-Satellites, Self-Healing Materials, Humanoid Robotics, Space-Based-Solar Power, Intelligent Satellites and Space-Vehicles.
- **Blockchain-based technologies:** Development of solutions in areas such as Decentralised Financing (DeFi), sovereign digital currencies, and the creation of sovereign identities.
- **Biotechnology:** This includes advancements in areas such as Synthetic DNA, development of vaccines, 4D printing and tissue engineering, gene editing, gene sequencing, quantum microscopes, biosensors, etc.
- **Agri-food Technologies:** Sustainable and remunerative agriculture is the key to food security and the technologies related to climate-resilient farming, development of high-yielding seed varieties, resource-conscious and frugal irrigation, seeding, harvesting, and post-harvest technologies have revolutionised agriculture.
- **Climate & Environmental Conservation:** Focus is on green and sustainable technologies, and on renewable energy such as solar, green hydrogen, etc.

### Way forward

- Digitisation has to be the common link in all the sectors of any successful economy as well as in all the aspects of a progressive society as it is expected that a lot of these technologies shall have synergy and interdependencies among them and hence there is a need for a comprehensive technology framework.
- There is a need for a close collaboration between the stakeholders of various sectors and industries to make use of these technologies to their complete potential.
- It is also important to acknowledge the role and extent of the digital character of these technologies in their successful deployment and acceptance.

### The success story of the Aadhar ecosystem

- Aadhaar has played an integral role in providing a unified national digital identity framework. Aadhaar has become one of the most important pieces of public digital infrastructure ever to be built in the country.

- Aadhaar is the world's largest Digital Identity Platform, which was planned and rolled out with a clear set of developmental objectives.
- The success of Aadhaar and its Digital Identity Platform with billions of authentication transactions already being performed on it has proved its reliability, robustness, and security to the entire international community.
- Aadhaar was conceived as an online identity platform that uses technology to deliver on its promises:
  - Uniqueness - ensuring one person one ID
  - Online verification and KYC to enable digital transactions
  - Not requiring expensive credentials such as smartcards, etc.
- Technologies that have been adopted by [UIDAI](#) include
  - Unified my-Aadhaar portal for a one-stop experience for users for all Aadhaar services in regional languages
  - Multiple services on mAadhaar mobile application
  - Use of secure QR code and offline for e-KYC for offline verification of Aadhaar
  - Introduction of Virtual ID, Aadhaar Lock, Biometric Lock for securely using Aadhaar for various services
  - Integration with Digilocker
- Technology innovations in authentication include:
  - Face Authentication
  - Iris-based Aadhaar Authentication
  - Fingerprint Image Record-based authentication

## Chapter 3: Deep-Tech Startup Ecosystem

### Startups in India

- India has a vibrant startup ecosystem with conducive infrastructure, incubators, development grants, angel/venture investors, mentors as well as a conducive policy environment.
- According to the [Economic Survey](#) of India 2021-22, there are 61400 registered startups in India, making it the third-largest startup ecosystem in the world with China and US occupying the first two places.
- Nearly 14,000 new startups were registered in India in 2021.
- In the last 10 years, Indian startups have generated over 6.6 lakh direct jobs and 34 lakh indirect jobs.
- Indian startups have raised USD 24 billion in the calendar year (CY) 21 compared to USD 10 billion in CY20.

- Further, there has been a significant localisation and diversification in the pool for startups in India.

### Deep-Tech Startups

- Deep-tech startups are those whose business models are based on high-tech innovation in engineering or significant scientific advances.
- Deep-tech startups arise from research-based, disruptive innovations from STEM labs of academic research institutions and solve hard problems and challenges.
- Examples:
  - Recycling sewage to get clean water at an affordable cost
  - Low-cost solution at scale for curing blindness
  - Affordable solutions for treating diseases such as diabetes, dementia, cancer, etc.
  - Creating an alternative to Lithium-ion batteries
  - Low-cost satellite launching systems

### Deep-Tech Startups in India

- The lack of deep-tech startups is a weakness that keeps India behind the developed countries.
- Deep-tech startups account for less than 1% of the number of startups, far below what a fast-growing, complex, and large economy like India should ideally have.
- Major challenges associated with deep-tech startups -
  - Deep-tech startups require a longer gestation period for development compared to other startups.
  - Deep-tech startups require different types of inputs such as more patient capital, specialised talent, and expert knowledge.
  - Deep-tech startups follow a different development path than other startups. The startup has to work backwards to find a real-life problem.

### Creating Ecosystem

- There is inadequate appreciation amongst policymakers and university administrators and there is a need to build capacity amongst academic researchers, scientists, and STEM students in India to truly understand what entrepreneurship entails and what commercialisation of research means.
- There is a big difference between making a successful technological breakthrough in the lab and building a successful enterprise around it. Becoming entrepreneurial cannot be imbibed by reading or scholastic programmes but only through experiential learning and expert mentoring/coaching.
- While the Government has made good efforts to fund innovation in universities through programmes such as prototype development, filing for IPR, incubation, etc., few academics commercialise their research by startups.



- Indian corporates and industries engaged with deep-tech startups do so only with those where technology is substantially developed or where revenues are visible.
  - A majority of Indian corporates do not have the knowledge or mechanisms for dealing with “Open Innovation” processes that university research institutions can potentially offer for creating deep-tech startups.

## Conclusion

There is a lack of awareness amongst policy makers on robust “Customer Discovery exercise” and its significant impact on the researchers/entrepreneurs. By linking development grants and investment programmes for deep tech startups with a robust Customer Discover exercise, we can create a significant amount of robust and curated deep-tech startups in India which will help address key challenges.

## Chapter 4: Artificial Intelligence (AI) And Machine Learning (ML)

### AI in India

- India was ranked 8th ahead of Russia and France among the top 10 countries by the AI patent families.
- AI-related patent applications have increased by 10 times between 2012 and 2018.
- A report called “AI Enabled SaaS: The Next Frontier for Global SaaS Start-ups from India” pointed out that AI has the ability to generate about 9,00,000 white-collar jobs and 3.6 million indirect jobs by 2030.
- To support this thriving AI industry, India has developed a conceptual national framework for the use of artificial intelligence (AI) and its allied field, machine learning (ML).
- The budget expenditure on AI and Machine Learning has also seen a steady increase with expected growth at a CAGR of 39% over the period 2019-2025 to reach USD 11,781 million in 2025.
- According to [NITI Aayog](#), AI has the potential to add USD 1 trillion to the Indian economy by 2035.

### NITI Aayog’s National Strategy for Artificial Intelligence

- NITI Aayog released a National Strategy for Artificial Intelligence **#AIforAll** in June 2018 to recognise AI's potential to transform the Indian economy and the need for India to build a comprehensive strategic framework.
- The National Strategy envisages supporting and enabling India's AI ecosystem through grants, product and solution development, collaboration with the industry, and mentorship support to startups.

- The paper lays out the roadmap for India to leverage the coming-of-age technologies to ensure inclusive growth and social development.
- **#AlforAll** aims at enhancing and empowering human capabilities to address challenges of access, affordability, and efficiency in endeavouring to scale Made-In-India AI solutions for the benefit of the developing and emerging economies.
- It lays out five priority sectors that are envisioned to gain the most from the adoption of these transformative technologies. They are:
  - **Healthcare** - Increasing access to healthcare
  - **Agriculture** - in terms of enhancing crop yield and ensuring food security
  - **Education** - to enhance the quality of education and human resource productivity
  - **Smart cities and infrastructure** - ensuring efficient connectivity
  - **Smart mobility and transportation**

### Other initiatives of NITI Aayog

- The [Atal Innovation Mission](#)
- Empowered Group-6
- RAISE 2020 summit
- Responsible AI Approach Documents published in collaboration with the World Economic Forum Centre for the next AI Industrial Revolution.

### Department of Telecommunications' draft framework on the India Artificial Intelligence Stack

- The draft report enables an environment to exploit AI productively across all sectors and bring interoperability between sectors.
- The Report highlights benefits of the AI Stack such as secure data storage and data privacy, easy interface, protection of digital rights, open API integration, trustworthiness, ethical standards, and usage of government Public Key Infrastructure (PKI).
- It further lays down the roadmap to increase public and private partnership in research, accelerating adoption of AI, skilling the workforce and ensuring ethics and principle for a responsible AI.

### Successful implementation of AI in India

- In Telangana, AI is used to authenticate pensioners and ensure that payments go to pensioners who are alive by using basic images and information to help validate recipients.
- The Ministry of Corporate Affairs is using AI to simplify corporate filings.
- The Centre for Artificial Intelligence and Robotics (CAIR) has been built as a special hub for AI-related work of the [DRDO](#).

## Conclusion

India sees AI and ML as the next transformative process to reform its economy and give it greater depth, and weed out irregularities. The use of AI and ML along with other technologies like blockchain would enable solutions to longstanding policy challenges in land transactions, medical record-keeping, education, defence, health and e-commerce.

## Chapter 5: AI in Education

### Background

- The pandemic has emphasised the importance and the need for online education, due to which, a hybrid model of teaching, which involves offline as well as online classes, has now become a new trend in India.
- In this context, the [University Grants Commission](#) (UGC) has recommended the application of modern teaching techniques, which include hybrid mode.
- Further, AI has been playing a key role in the education system of India, the need for adoption of which needs to be further expanded.
- The [New Education Policy \(NEP\)](#) has also been drafted and implemented incorporating all modes of teaching.

### Applications of AI in the Education sector

- **Robot Teachers**
  - Humanoid robot teachers can assist human teachers in delivering their lectures to students and robot teachers can make teaching more interesting for students using their AI capabilities.
  - AI-enabled robot teachers help in clearing the doubts of students and can complement human teachers in imparting lessons and replying to frequently asked questions (FAQs) of students.
- **Personalised Education**
  - AI can help in personalising the teaching pattern for an individual student as per their potential.
  - AI-based programmes can analyse the knowledge gaps, preferences, and learning ability of each student. Accordingly one can personalise the flexible teaching pattern for each student.
- **Tutoring**
  - AI plays a key role in tutoring students and addressing the doubts of students outside the classrooms. AI-enabled tools like Chatbots assist students in solving their queries.

- Further, AI has also resolved the issue of timely response as it can answer repetitive and commonly asked questions without delays.
- **Automated Grading System**
  - AI-powered grading software uses machine learning techniques and replicates human teachers' grading patterns and evaluates the answer papers.
  - It helps eliminate biased evaluating patterns of human teachers.
  - The automated grading system is most popularly used in optical mark recognition (OMR) criteria for evaluating multiple-choice questions by reading the shaded areas in the examination papers.
  - AI-enabled software can also be used for checking plagiarism in various documents and reports.
- **Natural Language Processing**
  - In the educational content, Natural Language Processing (NLP) can help students in making necessary corrections by suggesting corrections to their documents.
  - Examples of NLP software such as Grammarly help make writings clear and error-free.
  - Also, NLP software like Google Translate helps in translating one language to another.
- **Administrative Tasks**
  - AI can help teachers in performing their repetitive administrative tasks, such as scheduling classes, curriculum development, marking attendance, grading papers, sharing report cards of students automatically to the parents, etc.
  - AI has made the performance of administrative tasks easier and has improved the efficiency of teachers.
- **Creation of Smart Content**
  - AI-based software tools help in the creation of smart content that can range from digital textbooks, study guides, videos, etc.

## Conclusion

The use of AI in the education field can induce better efficiency and accuracy in various educational activities that would ultimately result in the improvement of the quality of education. Further, AI can be used to train teachers and increase their skills through the help of computerised tests and robot trainers.

## Chapter 6: NFT Explained

### Non-Fungible Tokens or NFTs

- Here, a “Token” can be anything such as a piece of art, a musical melody, a video, a game, or even a physical object and these tokens are mostly PNG images, animated images (GIF), MP4 audio tracks, or videos.

- An image becomes an NFT when it is stored on an online network of computers called Blockchain, and a unique serial number is assigned to it each time a Token is placed on the Blockchain Network.
- Each NFT has its unique serial number and that also makes the Token Non-Fungible.
- NFT cannot be replaced by another NFT, because even if it is the same image each copy of this image has its unique serial number and therefore, has its own value making it unique.
- The invention of NFT has allowed creators and artists to bypass the intermediary and decentralisation has taken place which has allowed artists to gain control over the financial value of their artworks and also over the ownership and copyright.

### Working of NFTs

- The NFTs are bought and sold using cryptocurrencies like Bitcoin, Ethereum, XRP, Dogecoin, Apecoin, Binance coin, WRX, etc.
- OpenSea is the first, largest, and internationally popular platform for selling crypto goods including NFTs.
- Cryptocurrencies are fungible, i.e. one Bitcoin can be replaced by another Bitcoin but each NFT is different from another and has a unique serial number in the Blockchain Network. Therefore, each NFT is one of a kind and can have a completely different value.

### Benefits of NFTs

- Each NFT is unique as it is impossible to create another NFT with the same serial number. Everything is verified by the blockchain and the owner of that Token on the blockchain will have full commercial copyright to use that image and asset.
- As they are unique and cannot be copied, they are scarce. Therefore, it is safe to assume that the owner of the NFT is one of the few people in the world to own the item.
- The metadata of the token cannot be tampered with which means that the image/item will never change and can never be deleted.
- Further, NFTs are collectable, downloadable, permanent, and resalable.

### Way forward

- As the use of NFTs is on the rise, it is important to understand the jargon around this technology as it will benefit one to adapt to the remarkable shift that is taking place all over the world in terms of how existing currency and financial systems are looked at.
- Experts feel that the beauty of NFTs is that their future isn't chiselled in a stone and nobody can predict what will become the most prominent use of NFTs.
- The risk-takers are writing the future of NFTs by trying out radical applications.
- Experts also feel that NFT-fication of everything will take place in the years to come.

## Chapter 7: Tech-Innovation in Banking

### Background

- The banking system in India was established 252 years ago and in recent years, the banks in India have shed their traditional way of functioning and emerged in a new avatar with the advent of new technologies.
- Post the nationalisation of banks in 1969 and the liberalisation in 1991, the era of competition and providing the best facilities to the customers started in the banking sector.
- ATM was first introduced into India by HSBC Bank in 1987 in Mumbai.
- ICICI bank introduced internet banking in India.
- The Central Bank of India was the first to offer credit card facilities in India.
- Currently, the UPI-based remittance and Aadhaar Enabled Payment System (AEPS) in India are far ahead of the technologies adopted in many western countries.
- Further, the banks in India are actively engaged in finding blockchain-based solutions for international remittances, syndicated loans, KYC, etc.

### Various measures towards simplifying the use of technology in banking

- The Government's flagship **Digital India Mission** and **Payment System** have helped in laying the foundation for the digital economy.
- Initiatives such as **Rupay** and **Kisan Credit Cards** have enabled farmers to engage in cashless transactions.
  - NABARD, since its inception, has provided financial support to enable cooperative and regional rural banks to issue EMV chip-based Kisan cards.
- The **Direct Benefit Transfer System (DBT)**, introduced in 2013 to directly transfer the benefits of the social security schemes to the accounts of the general public without any financial leakage, is also proving to be very effective.
- The establishment of a **Payments Bank** by the Reserve Bank of India, aimed towards increasing the access of small traders, low-income families, migrant workers, etc., to payments, remittances and other financial services through secure methods using technology is also said to be a significant step.
- Aadhaar Enabled Payment System (AEPS) is also playing a crucial role in improving the financial inclusion of people.

### Tech Advancements in Banking

- **NEFT-RTGS:** National Electronic Funds Transfer (NEFT) and Real-Time Gross Settlement (RTGS) are the facilities with the help of which individuals, companies, and firms can easily transfer money from one bank to another.
- **National Automated Clearing House (NACH):** Was launched in December 2012, the [National Payments Corporation of India \(NPCI\)](#) runs this service. This service plays a key role in data management, along with transparency and security.
- **Robotic Process Automation:** With the rapid growth of the digital economy and the increase in the amount of unstructured data, banks can make quick and large-scale transactions through technologies that enable cognitive and robotic processes.
- **Smart Virtual Assistants:** These are helping customers by handling banking transactions and providing relevant information.
- **Data Analytics:** These technologies have enabled banks to make informed decisions with actionable insights in real-time, face market competition, understand future launchable products and ensure customer satisfaction.
- **API Platform:** With the help of API Platforms, banks are engaging with Fintech, which allows them to provide a platform on which customers and third-party service providers can connect to deliver a flexible and personalised experience to the end-user.
- **Cyber Security:** The banking industry deals with sensitive and personal information, so cyber security technologies have a huge role to play. Tools used include advanced, analytical, real-time monitoring and biometrics software and anti-hacking tools.
- **Cloud Computing:** By utilising cloud-based services, banks are ensuring the security of customer data, reducing data storage costs and operating expenses. Cloud computing also has helped secure online payments, digital money transfers, wallet payments, etc.

### Way forward

- Acknowledging the importance of digitisation in the banking sector post the pandemic, the Indian banks, [RBI](#), government and private stakeholders must centre their focus on introducing various advanced technologies into the Indian payments systems.
- Efforts must also be undertaken to promote innovation, address challenges and explore opportunities in the banking sector through technology.

## Chapter 8: Advancements in Medicine

### Background

- Medical technology has been playing a key role in recent times in saving lives, improving the health conditions of individuals and contributing to sustainable healthcare.

- Medical technology has shown significant growth since the invention of a wooden tube by Rene Laennec, which was a primitive form of a stethoscope.
- Advanced technologies like Artificial Intelligence (AI), Robotics, 3D printing, Data Science, etc. are now being adopted in the medical field.
- Augmented, Virtual and Mixed Reality technologies are also being extensively used in diagnostics, therapeutics and also in medical education.

### The use of futuristic technology in specialised fields of medicine

- **Brain implants:** Brain implants are said to be an exciting development in new-age medical technology.
  - Brain implants create a brain-computer interface with a smart chip being implanted in the human body that acts as a functional replacement for any lost brain function.
  - The futuristic models are brain implant therapies for people paralysed by spinal cord injury or stroke.
- **Cybernetic Organisms (Cyborg):** This technology can be used not only to repair and replace a lost function but can also enhance existing ones.
  - The technology can help create Mini Super Human Powers in selective sensor functions like vision and hearing.
  - Memory chips with huge memory capacity can revolutionise human cognitive abilities.
- **Nuclear Medicine:** Human body contains about 20,000 molecules in total and diseases occur due to a random discord amongst them.
  - Nuclear medicine helps in visualising, measuring, and modifying these molecules and assists in administering appropriate medications that emit electromagnetic or particulate radiations and thereby help cure physical disabilities and diseases.
- **Orthopaedics and Physical Medicine:** 3D printing has revolutionised treatment in patients with bone loss by producing porous-coated customised implants that help prevent amputations.
  - AI/Machine technologies have been used in genome sequencing that helps in the early detection of a tumour through mathematical models.
  - Further, robotic surgery has induced perfection in complex arthroplasties.
- **Critical Care Medicine:** Critical care medicine which is integrated with AI support systems comes with algorithms that help identify patient symptoms and guide treatment.
- **Diagnostic Radiology:** AI and machine learning algorithms are used to detect abnormalities and have helped expedite the process of treating critical patients.
  - 3D Printing, Cinematic Rendering, Virtual Reality and Augmented Reality provide accurate anatomic and functional detail that guide complex cardiac procedures.
- **Intravascular Ultrasound (IVUS):** This technology has been adopted to demonstrate the anatomy of the artery wall, help in the treatment of vascular diseases and monitor the course of the treatment.





# Why choose the BYJU'S IAS Learning Program?



## Classroom sessions

Prepare for Prelims and Mains with India's leading IAS trainers



## Student Portal

Get access to recorded sessions of the Weekly Webinar, Issues in News, Current Affairs Magazine, Gist of Yojana and Practice Sets



## Stay Up-to-date

Regular and in-depth current affairs updates



## Mentor Support

Personalised feedback from our mentors



## Study Material

In-depth coverage of syllabus which includes the following guides: Indian Polity by M Laxmikanth, India's Ancient Past by R S Sharma, History Of Modern India by Bipan Chandra, Ethics, Integrity and Aptitude by P N Roy Chowdhury and G Subba Rao +16 more titles



## Test Your Knowledge

Perfect your exam writing skills and knowledge with - modular tests (MCQ and descriptive), question paper discussions, personalised analysis of answers and answer writing strategies



## Current Affairs Webinar

Twice a week live webinar classes to discuss current affairs followed by revision notes



## Ease of Accessibility

Prepare at your own convenience, anywhere and anytime with the BYJU'S IAS tablet

## Course Highlights

Daily news analysis based on The Hindu

Practice to perfection with Prelims and Mains Test Series

Post Mains Interview Guidance Program

### Delhi

B-1/8, Lower Ground Floor, Apsara Arcade, Sadhu Vaswani Marg, Pusa Road, Karol Bagh, Rajinder Nagar, Delhi 110005

Shop No. 19, Vardhaman Central Mall, Nehru Vihar, Delhi. nearest metro- Vishwa Vidyalaya metro station

### Hyderabad

Srishti Tower, Hitech City Rd, VIP Hills, Silicon Valley, Madhapur, Hyderabad, Telangana 500081

3-6-196/197, 2nd Floor, Prime Plaza, Himayatnagar Main Road, Himayatnagar, Hyderabad, Telangana 500029

### Bangalore

BYJU'S Classes, Tavarekere Main Rd, Opp: Forum back gate, Venkateshwara Layout, S.G. Palya, Bengaluru, Karnataka 560029

### Chennai

St Patricks School, Kasturba Nagar 3rd Cross St, Gandhi Nagar, Adyar, Chennai, Tamil Nadu 600020

To know more about our courses contact: +91 92435 00460