

National Mission on Interdisciplinary Cyber-Physical Systems

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Manifest Pedagogy

Industry 4.0 is a new epoch in the field of science and technology. The varied applications associated Cyber Physical Systems (CPS) are going to define the next generation applications and communications. CPS becomes very important topic as the Government has announced the mission on it. We can expect a question on it in Prelims as we have seen a question on Internet of Things (IoT) in 2018 Prelims.

In news

Cabinet approves National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)

Placing it in the syllabus

Indigenization of technology and developing new technology

Awareness in the fields of IT and Computers.

Static dimensions

- Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning (ML), Deep Learning (DL), Big Data Analytics. etc

Current dimensions

- The NM-ICPS and its benefits.

- Impact of National Mission on Interdisciplinary Cyber-Physical Systems

Content

Background:

Cyber-Physical Systems (CPS) are integrations of computation, networking, and physical processes. Embedded computers and networks monitor and control the physical processes, with feedback loops where physical processes affect computations and vice versa.

CPS and its associated technologies, like Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning (ML), Deep Learning (DL), Big Data Analytics, Robotics, Quantum Computing, Quantum Communication, Quantum encryption (Quantum Key Distribution), Data Science & Predictive analytics, Cyber Security for physical infrastructure and other infrastructure, have pervaded and is playing a transformative role in almost every field of human endeavour almost in all sectors.

It has become imperative for government and industries to be prepared to adopt these emerging and disruptive technologies in order to remain competitive, drive societal progress, generate employment, foster economic growth and to improve the overall quality of life and sustainability of the environment.

About the mission

The Mission addresses the ever increasing technological requirements of the society, and takes into account the international trends and road maps of leading countries for the next generation technologies. **The mission implementation would develop and bring:**

- Cyber Physical Systems (CPS) and associated technologies within reach in the country.

- Adoption of CPS technologies to address India specific National / Regional issues.
- Produce Next Generation skilled manpower in CPS.
- Catalyze Translational Research.
- Accelerate entrepreneurship and start-up ecosystem development in CPS.
- Give impetus to advanced research in CPS, Technology development and higher education in Science, Technology and Engineering disciplines, and
- Place India at par with other advanced countries and derive several direct and indirect benefits.

Implementation strategy

- The NM-ICPS is a comprehensive Mission which would address technology development, application development, human resource development & skill enhancement, entrepreneurship and start-up development in CPS and associated technologies.
- **The Mission aims at** establishment of:
 - 15 numbers of Technology Innovation Hubs (TIH)
 - 6 numbers of Application Innovation Hubs (AIH)
 - 4 numbers of Technology Translation Research Parks (TTRP).

These Hubs & TTRPs will connect to Academics, Industry, Central Ministries and State Government in developing solutions at reputed academic, R&D and other organizations across the country in a hub and spoke model.

- **A strategic approach involving** a suitable mix of Academic, Industry and Government is proposed to be adopted.
- Strong Steering and Monitoring Mechanisms in the form of Mission Governing Board (MGB), Inter-Ministerial Coordination Committee (IMCC), Scientific Advisory Committee (SAC) and other Sub-Committees will guide and monitor the Mission implementation.

- The Hubs & TTRPs have four focused areas along which the Mission implementation would proceed, namely

1. Technology Development.
2. HRD & Skill Development.
3. Innovation, Entrepreneurship & Startups Ecosystem Development.
4. International Collaborations.

Impact of the Mission

- CPS technologies provide a cutting edge to a Nation's scientific, engineering, and technological innovative capabilities; support other missions of the government, provide industrial and economic competitiveness and have truly become a Strategic Resource.
- Volume, scale and complexity of emerging applications demand continued evolution of new technologies for the foreseeable future.
- The proposed Mission would act as an engine of growth that would benefit national initiatives in health, education, energy, environment, agriculture, strategic cum security, and industrial sectors, Industry 4.0, SMART Cities, Sustainable Development Goals (SDGs) etc.
- CPS is an integrated system of upcoming technology, which in turn is being taken up on priority basis by countries in the race for development.
- CPS will indeed bring a paradigm shift in entire skill sets requirement.
- The job opportunities will be enhanced through the Mission by imparting advanced skills and generating skilled manpower as per the requirement of the industry/society.
- As Innovation, Entrepreneurship and Start-up Ecosystem is an integral part of the proposed NM-ICPS, the start-ups will also create a number of technology driven job opportunities in CPS and allied areas.

Benefits:

The Mission will feed the Central Ministries/ Departments and State Govts and also the Industry to effectively use the CPS technologies in their projects and schemes for the benefit of the society.

States/districts covered under it:

NM-ICPS is a Pan India Mission and covers entire gamut of India that includes Central Ministries, State Governments, Industry and Academia.