

Skill Development at Homi Bhabha National Institute



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Workshop on SHANTI Act 2005: Enabling India's 100 GW Nuclear Power Roadmap through Public-Private Partnership
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HBNI : A Research University

(A Deemed-to-be University under Sec 3 of the UGC Act (1956), established under DAE in 2005)



- Accredited as Grant-in-Aid Institute of the Department of Atomic Energy (DAE) w.e.f. Feb. 19, 2014.
- The University has a **distributed structure** with a unique architecture : it brings together academic programmes of **14 premier institutions of DAE**, comprising of **4 R&D Centres** and **10 Grant-in-aid institutions**.

Objectives of HBNI: To encourage pursuit of **excellence in sciences (including engineering sciences) and mathematics** in a manner that has major significance for the progress of **indigenous nuclear technological capability** through **Multidisciplinary & inter-disciplinary research** realizing the mission of **Atmanirbhar Bharat**.

R & D Centres

- [Bhabha Atomic Research Centre, Mumbai](#)
- [Indira Gandhi Centre for Atomic Research, Kalpakkam](#)
- [Raja Ramanna Centre for Advanced Technology, Indore](#)
- [Variable Energy Cyclotron Centre, Kolkata](#)

Grant-in-Aid Institutions

- [Institute for Plasma Research, Gandhinagar](#)
- [Saha Institute for Nuclear Physics, Kolkata](#)
- [Tata Memorial Centre, Mumbai](#)
- [Institute for Mathematical Sciences, Chennai](#)
- [Harishchandra Research Institute, Allahabad](#)
- [Institute of Physics, Bhubaneswar](#)
- [National Institute of Science Education and Research, Bhubaneswar](#)
- [Homi Bhabha Cancer Hospital & Mahamana Pandit Madan Mohan Malaviya Cancer Centre \(HBCH & MPMMCC\), Varanasi](#)
- [Homi Bhabha Cancer Hospital & Research Centre, \(HBCH & RC\), New Chandigarh, Punjab](#)
- [Advanced Centre for Treatment, Research and Education in Cancer, Navi Mumbai \(OCC\)](#)



Academic Programs in HBNI

- HBNI presently runs **48 academic programs** under **9 Board of Studies (BoS)** in various disciplines
- HBNI also offers several unique programs that are skill based.

Board of Studies

- ✓ Chemical sciences
- ✓ Engineering sciences
- ✓ Medical and Health sciences
- ✓ Life sciences
- ✓ Mathematical sciences
- ✓ Physical sciences
- ✓ Studies for Applied systems analysis
- ✓ Integrated Masters Programme
- ✓ Interdisciplinary Science and Engineering

Courses offered

- ✓ Ph.D. (3133)
- ✓ M. Tech (1803)
- ✓ M.Sc. (Engg) (127)
- ✓ Integrated M.Sc (1514)
- ✓ M.D., D.M. and M.Ch. (Oncology) (916, 247, 295)
- ✓ Diploma courses (i.e. PGD, DipNSE, DipRP) (1590)
- ✓ Specialty courses M.Sc. (Hospital Radiopharmacy), M.Sc. (Occupational Therapy in Oncology) and M.Sc. (Nuclear Medicine and Molecular Imaging Technology) (350)
- ✓ Certified Fellowships (227)

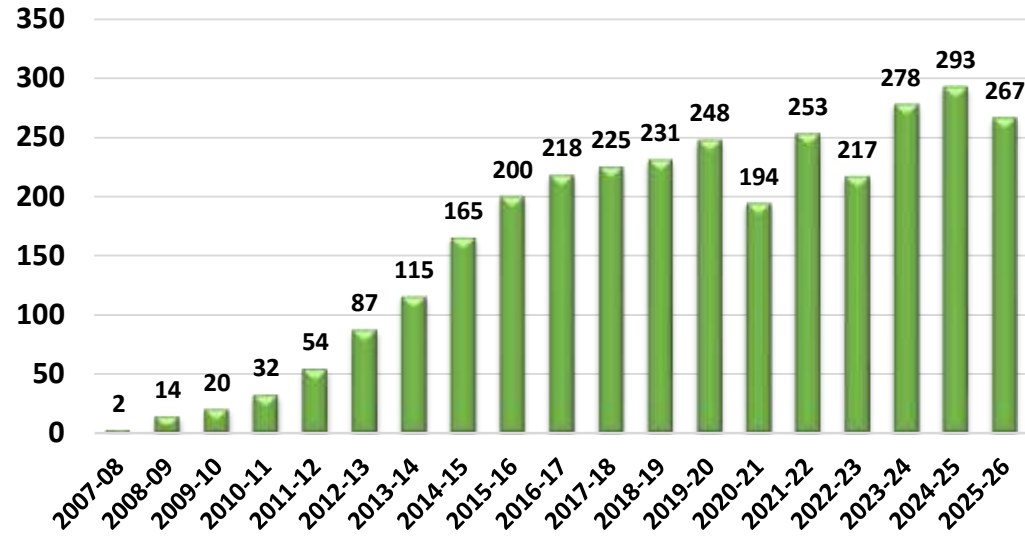
As on Dec 31, 2025 HBNI has **1281 Faculty** and **3985 students** on its rolls.

Degree/diploma/certificate awarded by HBNI since 2007: 10182

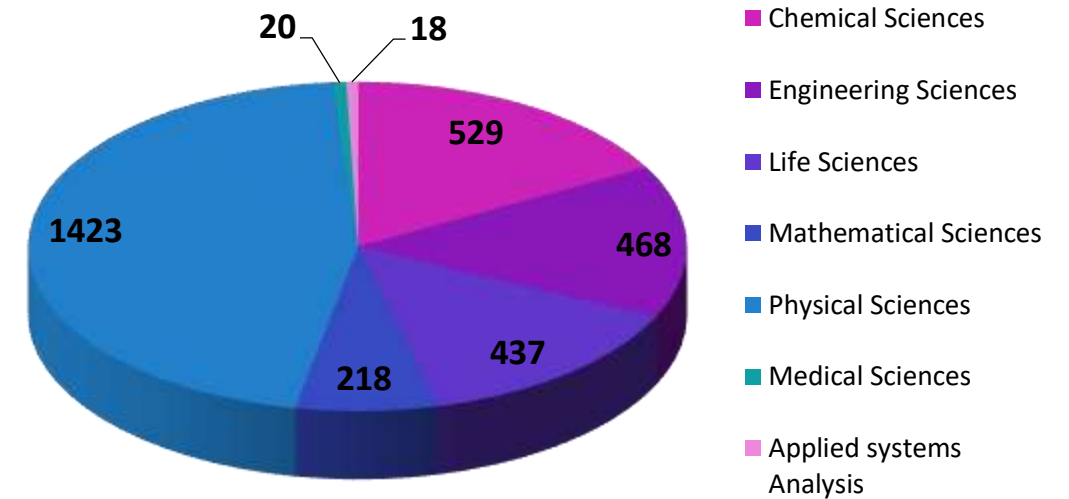
(PhD – 31%, M. Tech and M Sc(Engg) – 19%, Medical & Health – 20%, M.Sc - 15 %, Diploma – 15 %)

Students' Statistics Year wise

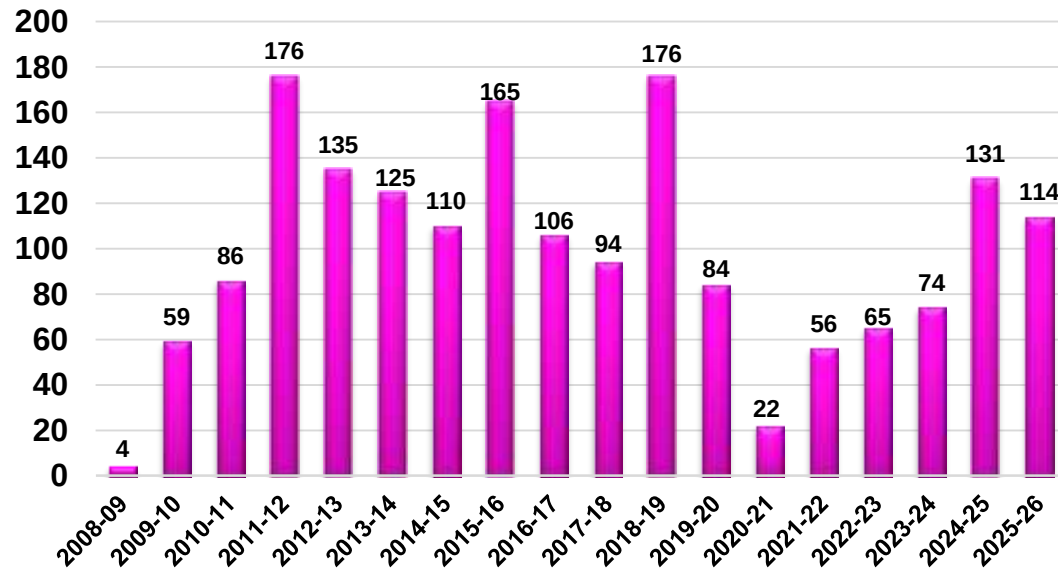
Year wise Ph.D results declared



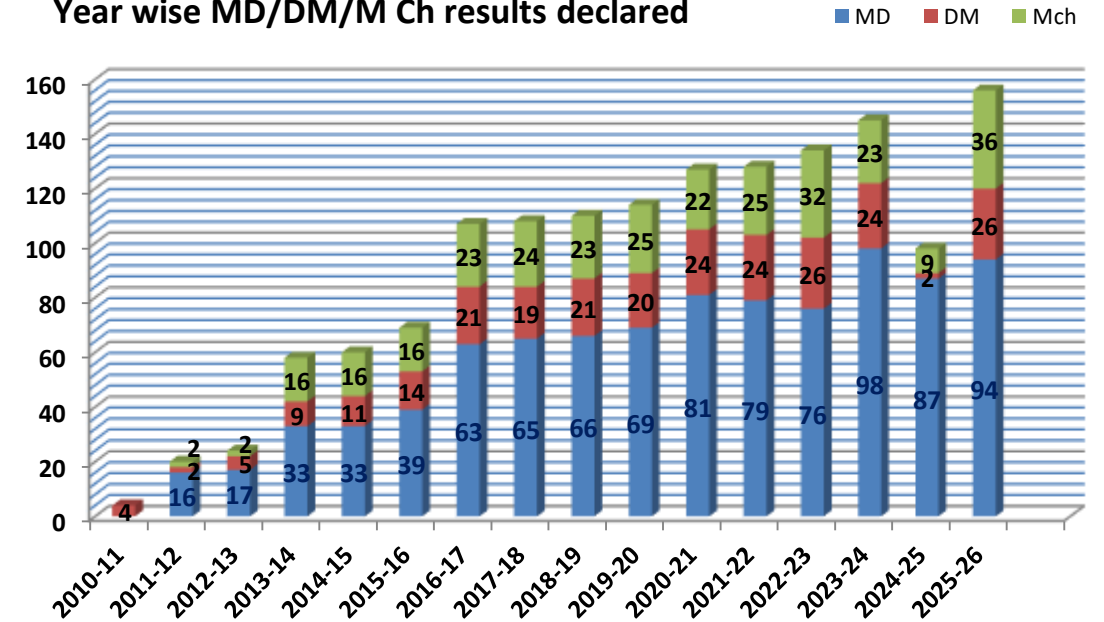
Discipline wise distribution of Total (3113) Ph.D results declared since inception



Year wise M.Tech results declared



Year wise MD/DM/M Ch results declared



Opportunities ahead & Role of HBNI as facilitator for Skill Development

- **Rapid expansion**, is taking place in all sectors of nuclear energy (including **power** and **radioisotopes** for medical, health care, agriculture and industrial applications).
- **Civil nuclear energy will ensure a significant contribution to the country's development for Viksit Bharat (Hon Prime Minister of India)**
- With improving **life expectancy**, India's role as a **global healthcare destination** and to provide **quality care to cancer patients** in the country, demand for radioisotopes is expected to increase several folds.

Nuclear Energy Mission for Viksit Bharat

Present Capacity	8.18 GWe
Near Term targets (2032)	22.5 GWe
Long Term targets (2047)	100 GWe

Major radioisotopes for healthcare - DAE

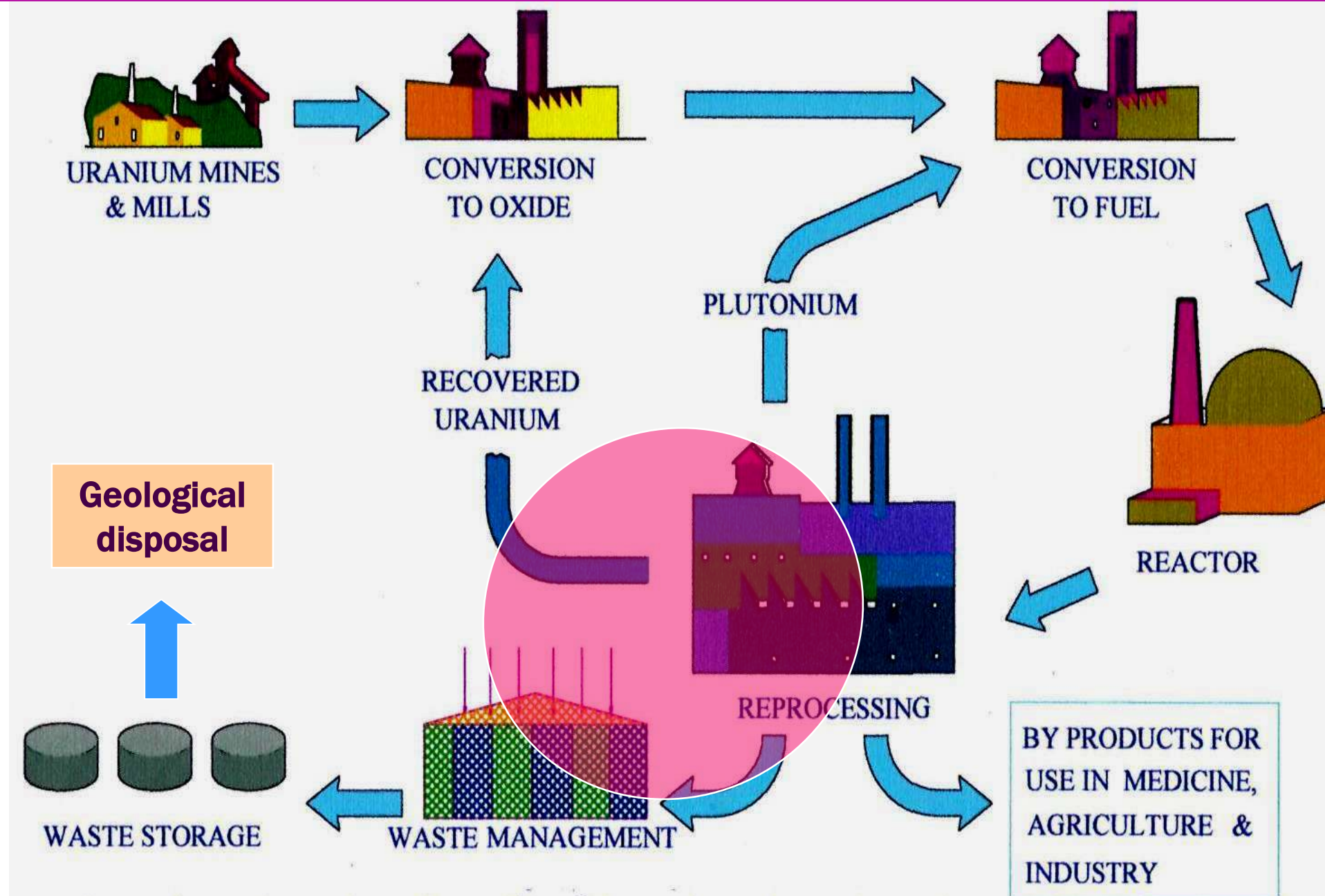
S. No.	Radioisotope	Major Products	% Market Share
1	I-131	¹³¹ I-Nal oral solution/capsules, ¹³¹ I-MIBG	~40-50 %
2	Lu-177	¹⁷⁷ Lu-DOTATATE, ¹⁷⁷ Lu-PSMA-617	> 90 %
3	Mo-99	⁹⁹ Mo/ ^{99m} Tc generator	~ 15-20 %
4	Co-60	Teletherapy source	100 %
5	Cs-137/Co-60	Blood irradiator	100 %

Skilled & Trained Manpower is vital in our journey to a Developed Nation !

Nuclear Power and Associated Fuel Cycle

Key Segments

- Front-end
- Reactor / Nuclear System
- Back-end

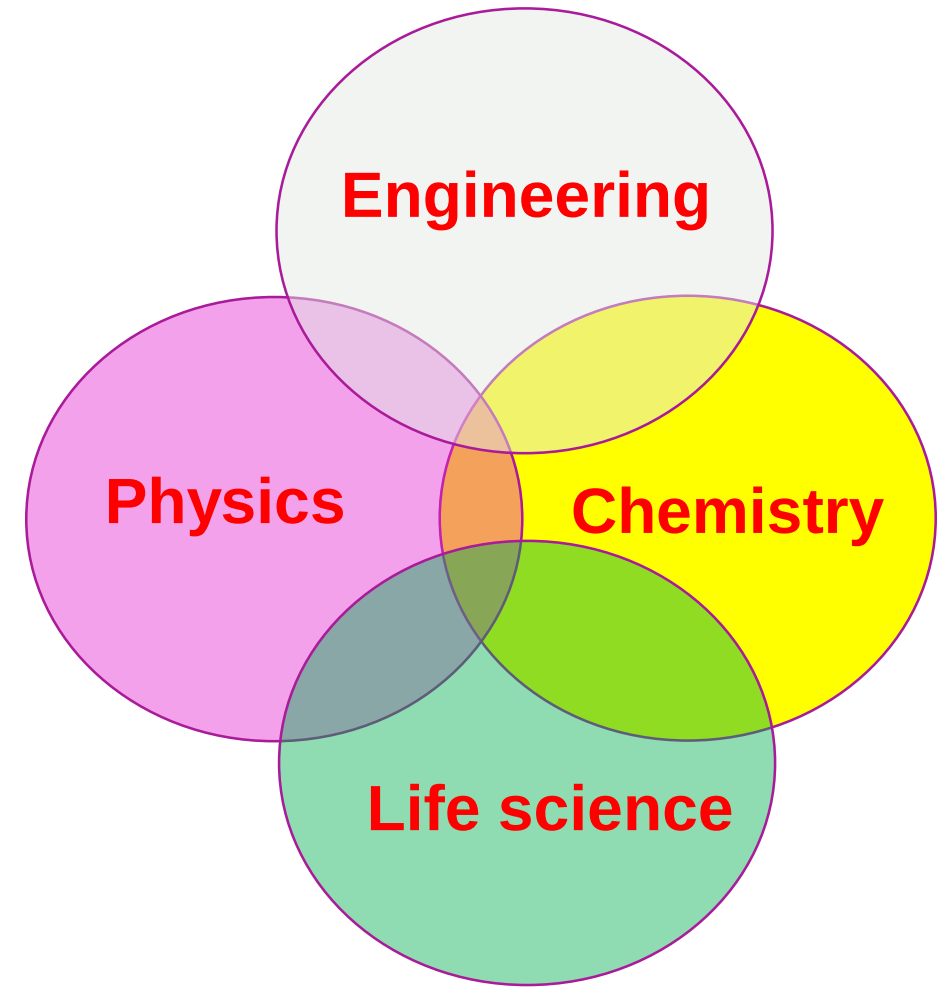


Unique Requirements of Nuclear Sector

How nuclear fuel cycle is different from other industries?

- Multidisciplinary
- Inter-disciplinary
- Safety and Security
- Heavily regularized (RSO is a must even for handling smallest amount of radioisotopes)
- Highly skilled and Inter & Multi disciplinary manpower is required even for operation of systems designed by others. For example, a reactor physicist is required not only for reactor design calculations but also for fuel management during reactor operation. Much more precise radiation simulations are required for radiation therapy.
- Long term commitment

Typically, trained manpower from several specializations is required for handling any nuclear system.

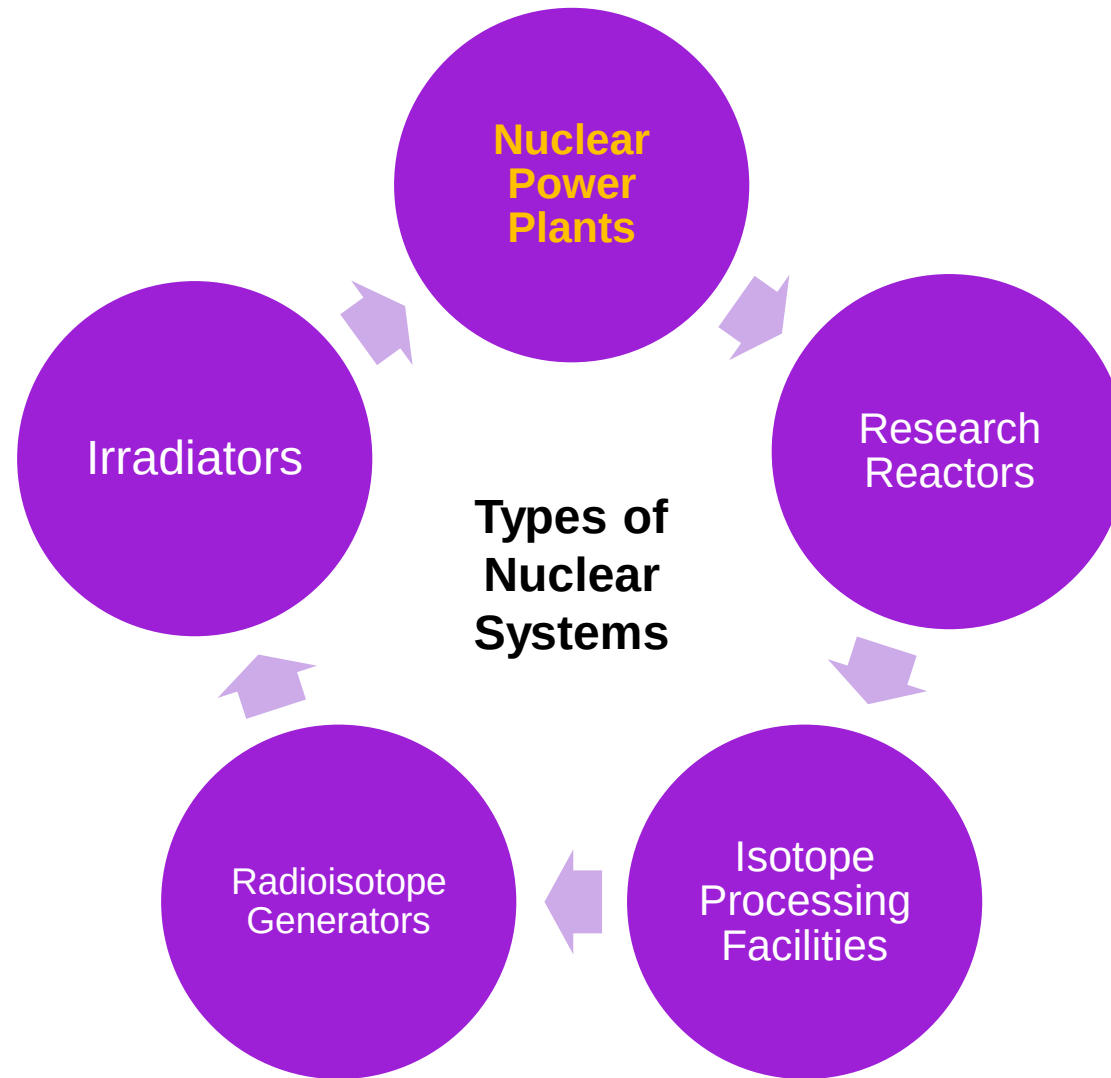


Role of HBNI is to act as a facilitator not only for DAE fraternity but also for the Nation as a whole.

HBNI as facilitator of SHANTI Act 2025

Areas of Expertise:

- ✓ Geologists
- ✓ Physicists
- ✓ Chemists
- ✓ Biologists
- ✓ Engineers
- ✓ Mathematicians
- ✓ Medical and health care specialists



Roles:

- ✓ RSO (Radiation Safety Officers)
- ✓ Technicians and Supervisors (Fitters, Welders, Electricians etc)
- ✓ Analysts
- ✓ Plant Operators
- ✓ Construction and Maintenance Personnel.

Educational qualifications: Technicians, graduates, post graduates, PhDs

India has a vast pool of engineers and technicians. For catering the needs of the Nuclear Industry, these engineers and technicians require orientation courses in nuclear science and engineering.

Skill development through HBNI: Connect with HBNI

- ✓ Workshops / Symposia / Webinars / Expert Talks / Publications
- ✓ **Conferences**
- ✓ Research Scholar's meet
- ✓ **Value added courses** (Radiation Safety, Reactor Physics, Reactor Control and Instrumentation, Materials, Coolant (Water) Chemistry and Corrosion, Computational Fluid Dynamics, FEM, Piping and Pressure Vessel integrity Analysis, Reactor Safety, Reactor Thermal-hydraulics, ASME Boiler and Pressure Vessel Code Section V, Reactor operation, Disaster Management, Waste Handling, **Severe Accident Phenomenology, Corrosion Degradation in Light Water Reactors, Structural Integrity Assessment of Mechanical Components: Concepts & Procedures**)
- ✓ Familiarization with Regulatory Codes and Guides
- ✓ **Nuclear law and IPR**
- ✓ Courses in the niche areas of nuclear science and technology through NPTEL
- ✓ **Courses in Plasma research, LASER Technology**
- ✓ Certification Courses (Welder qualification, Image processing)
- ✓ **Certification courses in Oncology**
- ✓ Any other requirement of industry

Invitation to Connect with HBNI for the benefit of All

Present scenario:

- ✓ 250 - 300 PhD students graduate from HBNI each year. Industry is invited for recruitment of these students.
- ✓ Nearly 200 students graduate from HBNI in health sciences discipline.

Way Forward:

- ✓ In addition to **48 regular programs** presently being offered by HBNI, we can help in structuring special courses as per the requirements of the industry.
- ✓ QIP courses are being offered by HBNI through its CI and OCCs for skill upgradation.

Radiation does not know any boundaries. Safe and secure operation of any nuclear system by any entity is the responsibility of all other entities because any incident at one place leads to loss of credibility for all.

Nuclear Safety & Security is the responsibility of all !

HBNI is ready to partner with industry in the service of nation for realizing the goal of 'VIKSIT BHARAT'.



HOMI BHABHA NATIONAL INSTITUTE (HBNI)



A deemed to be University under section 3 of the UGC Act (1956), established under DAE in 2005

Location of HBNI Central Office, Constituent Institutions & Off Campus Centres



HOMI BHABHA NATIONAL INSTITUTE

(An aided institution of the Department of Atomic Energy and a Deemed to be University under Section 3 of the UGC Act 1956)

2nd Floor, BARC Training School Complex,

“To encourage pursuit of excellence in sciences (including engineering sciences) and mathematics in a manner that has major significance for the progress of indigenous nuclear technological capability.”

48 programmes offered

- ✓ Ph.D.
- ✓ Integrated Ph.D.
- ✓ M. Tech., M.Sc.
- ✓ Integrated M.Sc.
- ✓ M.D., D.M. and M.Ch. (Oncology)
- ✓ Diploma course (DipRP)
- ✓ Specialty courses M.Sc. (Hospital Radiopharmacy), M.Sc. (Occupational Therapy in Oncology) and M.Sc. (Nuclear Medicine and Molecular Imaging Technology)

NAAC's accreditation (2021-26) with “A⁺” grade /
CGPA of 3.4 on 4 point scale



2025

7th: Research Institutions
12th: University
20th: Overall



2025

1st: Physical Sciences
3rd: All subjects
category

www.hbni.ac.in

A misty, atmospheric photograph of a park. In the foreground, a large, leafy tree stands on the left, its branches spreading over a concrete bench. The ground is covered in green grass and a thick layer of fallen orange and red leaves. In the background, another bench is visible on a path, surrounded by more trees and shrubs, all shrouded in a soft, white mist. The overall mood is peaceful and serene.

Thank You