

ANNUAL QUALITY ASSURANCE REPORT OF HBNI

Year: 2017-18



HOMI BHABHA NATIONAL INSTITUTE

*a Deemed University u/s 3 of UGC Act, MHRD and an aided institute of the
Department of Atomic Energy, Govt. of India*

**Report of the Internal Quality Assurance Cell (IQAC)
and
Annual Quality Assurance Report (AQAR)**

PART - A

I. Details of the Institution

- 1.1 Name of the Institution : Homi Bhabha National Institute
- 1.2 Address Line 1 : 2nd Floor, Training School
- Address Line 2 : Training School Complex,
Anushaktinagar,
- City/ Town : Mumbai – 400 094.
- State : Maharashtra
- Pin Code : 400 094
- Institution e-mail address : vcoff@hbni.ac.in, registrar @hbni.ac.in
- Contact Nos. 022 – 25597554
022 – 25597626
- Name of the Head of the Institution: Prof. P.R.Vasudeva Rao
- Tele No. with STD Code: 022-25597638
- Mobile +91 9566535738
- Name of the IQAC Coordinator : Dr. B. Chandrasekar, Registrar
- Mobile +91 9899753575
- IQAC e-mail address : registrar@hbni.ac.in
bchandrasekar@hbni.ac.in
- I.3. NAAC Track ID : MHUNGN11171
- I.4. NAAC Executive Committee No.: EC(SC)/07/A&A/08
& Date (For eg., EC/32/A&A/143
dated 3/5/2004
- 1.5 Website address : www.hbni.ac.in
Web-link of the AQAR www.hbni.ac.in/main/dsp_doc.html?nm=NAAC/aqr2018.pdf

1.6. Accreditation Details

S. No.	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1 st Cycle	A	3.53	2015	Till May 2020
2.	2 nd Cycle				
3.	3 rd Cycle				

4.	4 th Cycle				
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1.7. **Date of Establishment of IQAC** : 27th June 2014

1.8. **AQAR for the year (for eg., 2010-11)** : **2017- 2018**

1.9. **Details of the previous year's AQAR submitted to NAAC**

(after the latest Assessment and Accreditation by NAAC (for example AQAR 2010-11 submitted to NAAC on 12-10-2011))

NOT APPLICABLE

- i. AQAR _____ (DD/MM/YYYY)
 ii. AQAR _____ (DD/MM/YYYY)
 iii. AQAR _____ (DD/MM/YYYY)
 iv. AQAR _____ (DD/MM/YYYY)

1.10. **Institutional status**

University	State	Central	<input checked="" type="checkbox"/>	Deemed	<input checked="" type="checkbox"/>	Private
Affiliated College			Yes			No <input checked="" type="checkbox"/>
Constituent College			Yes			No <input checked="" type="checkbox"/>
Autonomous College of UGC			Yes			No <input checked="" type="checkbox"/>
Regulatory Agency approved Institution (eg. AICTE, BCI, MCI, PCI, NCI)			Yes <input checked="" type="checkbox"/>			No
Type of Institution		Co-education	<input checked="" type="checkbox"/>	Men		Women
		Urban	<input checked="" type="checkbox"/>	Rural		Tribal
Financial Status		Grant-in-aid	<input checked="" type="checkbox"/>	UGC 2(f)		UGC 12(B)
				Grant-in-aid + Self Financing		
				Totally Self-financing		

1.11 **Type of Faculty/ Programme**

Arts	Sciences	<input checked="" type="checkbox"/>	Commerce	Law	PEI (Phy.Edu)
TEI (Edu)	Engineering	<input checked="" type="checkbox"/>	Health-Science	<input checked="" type="checkbox"/>	Management
Others (Specify):	[Applied Systems]				

1.12 **Name of the Affiliating University (for the Colleges):** NA

1.13 **Special status conferred by Central/ State Government** UGC/ CSIR/ DST/ DBT/ICMR etc.

Autonomy by State/Central govt./ University: Autonomy by Central Govt.

University with Potential for Excellence	UGC-CPE
DST Star Scheme	UGC-CE
UGC-Special Assistance Programme	DST-FIST
UGC- Innovative PG Programmes	Any other (Specify)
UGC-COP Programmes	

2. IQAC Composition and Activities

2.1 No. of Teachers					7
2.2 No. of Administrative /Technical staff					2
2.3 No. of Students					1
2.4 No. of Management representatives					2
2.5 No. of Alumni					2
2.6 No. of any other stakeholder and Community representatives					-
2.7 No. of Employers/ Industrialists					-
2.8 No. of other External Experts					1
2.9 Total No. of members					14
2.10 No. of IQAC meetings held					1
2.11 No. of meetings with various stakeholders:	No	Faculty	0		
Non- Teaching Staff	Students	Alumni	Others		
2.12 Has IQAC received any funding from UGC during the year?	Yes	No	[X]		
If yes, mention the amount					

2.13 Seminars and Conferences (only quality related)

(i) No. of Seminars/Conferences/ Workshops/ Symposia organized by the IQAC

Total Nos.	International	National	State	Institution Level
1				1

Themes: On-line courses and credit systems

2.14 Significant Activities and contributions made by IQAC

- (i) HBNI initiated a colloquium program
- (ii) A key resource person of NPTEL Prof. Mangal Sundar Krishnan, IIT Madras was invited to give in-depth exposure on the use of NPTEL contents and the classroom technology relevant for PG Education in the relevant areas.
- (iii) Online learning and online based self-learning is formally recognized as part of curriculum in the PG level courses in HBNI

2.15 Plan of Action by IQAC/ Outcome

The plan of action chalked out by the IQAC in the beginning of the year towards quality enhancement and the outcome achieved by the end of the year.

Plan of Action

The IQAC, in the first meeting held in the year 2016, planned key initiatives viz., curriculum design, choice-based credit system, core electives and open electives. The courses at the PG and doctoral levels had implemented quality strategies and new innovation and best practices across all the academic and related activities.

Achievements

The initiatives implemented in the year have been systematically followed and are part of the core academic processes and the same is reported and recorded in the Board of Studies and Academic Council meetings. The Council of Management, which is the apex body for the Institute has been kept informed on the Academic Quality Initiatives being implemented.

2.16. Whether the AQAR was placed in statutory body: Yes No

Management: Syndicate Any other body

Provide the details of the action taken.

The AQAR was placed in the following statutory bodies for information and ratification.

- (i) **The Academic Council**
- (ii) **Standing Committee of Deans**
- (iii) **The Council of Management (CoM), which is the apex body of the HBNI.**

PART - B

CRITERION - I

I. Curricular Aspects

1.1 Details about Academic Programmes

Level of the programme	Number of existing Programmes	Number of Programmes added during the year	Number of self-financing Programmes	Number of value added/ Career Oriented Programmes ^{&}
PhD	7 disciplines [#]	+	-	Y
PG				
MTech	14	+	-	Y
MSc Engg.	1	+	-	Y
MSc	2	+		
DM	4 ^{\$}	+		
MCh	4 *	+	-	Y
MD	8 **	+	-	Y
MSc (nursing & clinic res.	2	+	-	Y
PG Diploma	4	+	-	Y
Diploma	0	+	-	Y
Total	44			

+As per plans of the respective Boards of Studies and approved by the Academic Council.

[#]Chemical sciences, Engineering sciences, Life sciences, Mathematical Sciences, Physical sciences, Health sciences, Studies for Applied systems Analysis.

^{\$} Medical Oncology, Pediatric Oncology, Gastroenterology, Critical Care Medicine, Interventional Radiology

* Surgical oncology, Gynecological oncology, Plastic surgery, Head & Neck oncology

**Pathology, Anesthesia, Radiodiagnosis, Radiotherapy, Microbiology, Nuclear Medicine, Palliative Medicine, Immunohematology and Blood Transfusion)

[&]All the courses conducted by HBNI lead to a career in research, education, industry or health care services.

1.2 Flexibility of the Curriculum: (i) CBCS/ Core/ Elective option/ Open options: All options available for the type of programmes as under.

All courses conducted by HBNI follow the CBCS pattern.

Pattern	No. of programmes
Semester	All MSc
Trimester	MTech, PGDNSE, DIPRP
Annual	MSc (Clinical Research), MSc (Nursing)

1.3 Feedback from stakeholders*: Alumni Parents Employers Students
(On all aspects)

Mode of feedback: Online Manual Co-operating schools (for PEI)

1.4 Whether there is any revision/ update of regulation or syllabi, if yes, mention their salient aspects.

The post graduate course curriculum is updated following the regulations of HBNI and recent trends and development in the respective sectors. The inputs of the respective Board of Studies are considered in updating the curriculum periodically (at least once in three years) as per the recent trends and development in the disciplines.

1.5 Any new Department /Centre introduced during the year. If yes, give details.

Yes No

CRITERION - II

2. Teaching Learning and Evaluation

2.1 Total No. of Permanent faculty

Cadres/ Levels	BARC	IGCAR	RRCAT	SINP	IPR	IOP	NISER	HRI	TMC	IMSc	VECC
Asst. Prof.	133	22	17	32	23	12	64	06	62	19	17
Assoc. Prof.	106	27	26	39	16	02	03	14	51	10	09
Prof. (s)/ Sr. Prof.	124	40	17	22	05	10	03	16	63	25	14
Others – Adjunct faculty	25 [§]	<i>All the CIs engage / invite faculty from the IITs and such other national institutions for invited lectures in the specialized areas as per the needs.</i>									
Total	388	89	60	93	44	24	70	36	176	54	40

[§]Scientific Officers from R&D centres of DAE are recognized by HBNI as Adjunct faculty in the respective Schools, Disciplines of Studies as per the BoS regulations and approved by the Authorities such as Academic Council/ Council of Management.

2.2 No. of permanent faculty with PhD: All faculty in HBNI have PhD degree.

2.3 No. of Faculty Positions Recruited (R) and Vacant (V) during the year

Asst. Professors		Associate Professors		Professors		Other(s)		Total	
R	V	R	V	R	V	R	V	R	V
*	*	*	*	*	*	*	*	*	*

**In HBNI, there is no fixed number of faculty positions. The faculty positions are based on their nomination by the respective Heads of the Institutes and their position is upgraded based on their scientific achievements in their field of specialization.*

2.4 No. of Guest and visiting faculty and Temporary faculty

The Constituent Institutions and Off-campus Centre of HBNI engage Guest and Visiting faculty as per requirement.

2.5 Faculty Participation in conferences and symposia

No. of Faculty	International level	National level	State/ regional level
Attended	<i>A large proportion of the HBNI faculty members in various research centres of DAE get opportunities to participate in international / national conferences/symposia and participate in collaborative projects, as per requirements of the research programs pursued in the respective institutions.</i>		
Presented Papers			
Resource Persons			

2.6 Innovative Processes adopted by the institution in the Teaching and Learning

All the CIs and OCCs are adopting the modern practices in teaching learning technologies. The wider use of NPTEL has been adopted across the CIs/ OCC. These courses are introduced as self-study courses along with credits, which enables students to pursue at their learning pace. In addition, the video recording of the PG lectures has been enabled and these lectures are put on line for access by others CIs/ OCC.

HBNI has also initiated e-patashala for making available e-learning resources to researchers and students.

The Institute has always been open to innovative teaching methods. Towards this objective, the faculty has adopted the use of simulators, dynamic reactor models and interactive boards to enhance the learning experience. The use of such practices has been well received by the students as elicited from them in the feedbacks received. The teaching community of the Institute is a self-motivated and dedicated lot and the nomination of a specialist to the teaching process is by itself considered as a recognition of merit. However, in acknowledgment of the fact that appreciation and formal recognition are necessary towards the sustenance of any system, a mechanism to award meritorious and innovative teachers is in the process of being formulated and implemented.

2.7 Total No. of actual teaching days during this academic year: 230 – 240 days

2.8 Examination, Evaluation Reforms initiated by the Institution (for example: Open Book Examination, Bar Coding, Double Valuation, Photocopy, Online Multiple-Choice Questions)

A large student population is at BARC Training Schools, where the examination process has been streamlined with the introduction of several innovative measures. For example, mark sheets and certificates are generated by Trainee Management System (TMS) portal, ensuring data integrity and instant computations and communications to the faculty as well as students

BARC training schools follow the system of two semesters and a summer semester. Two rounds of examinations are held in both the semesters and there is one round of examination in summer semester. Such examination pattern makes it close to continuous evaluation system. In addition to the examinations, assignments are given to the students by many

course instructors and evaluated periodically. All doctoral courses conducted by CIs/OCC follow semester systems.

The PhD evaluation process followed by HBNI is comprehensive and rigorous. A general comprehensive examination is held in the beginning of the PhD programme to evaluate the broad-based knowledge of the student. Periodic progress reviews are carried out by student specific doctoral committees. The thesis evaluation is done by two external reviewers, preferably one reviewer from an international university/ faculty in the similar areas of research undertaken. The final public viva voce is conducted by doctoral committee along with one external examiner.

HBNI has a policy of providing flexibility to CIs with regard to conducting examinations. Accordingly, a flexible examination pattern is followed at all CIs. The general structure consists of course evaluation based on home assignments, mid-term examination and final examination. The pattern of mid-term and final examination is left to the instructors. These exams range from closed book, closed notes exams to open book, indefinite time exams. Clearly this has helped in tapping creative potentials among students.

Results are generally announced within a couple of weeks of examinations. In case of doctoral students, while every care is taken to complete the evaluation process in a short time (one to two months), there have been instances wherein external examiners have delayed sending reports.

2.9 No. of faculty members involved in curriculum restructuring / revision/ syllabus development as member of Board of Study/ Faculty/ Curriculum Development workshop 080

2.10 Average percentage of attendance of students: > 80%

2.11 Course/ Programme wise Distribution of pass percentage:

Title of the Programme	Total no. of students appeared (2017-18)	Division				
		Distinction%	I%	II%	III%	Pass%
MSc Engg.						100
MTech						90
MD/ MS						100
PhD						90

2.12 How does IQAC Contribute/ Monitor/ Evaluate the Teaching & Learning Processes:

The IQAC had enabled the CIs/ OCC to put in place institution centric teaching learning processes that directly have positive impact on the student learning.

- The decentralized academic governance has facilitated flexible curriculum including the mini-projects that are undertaken by the students under the guidance of senior faculty members
- A comprehensive evaluation of these projects are undertaken through submission of a project report, presentation of the project outcomes, methodology and a viva voce examination.
- Making available the e-lectures, video recording of the lecture by the faculty members and the same being available at all time for learning and reference.

2.13 Initiatives undertaken towards faculty development

- a. Faculty members are encouraged to publish the research work in peer reviewed journals.
- b. They are encouraged to participate in national/international conferences
- c. Faculty members take up various post-doctoral position
- d. They are encouraged to participate in international collaborative projects e.g. CERN, ITER, Fermilab, ALICE etc.
- e. They participate in joint research projects through extra mural grants e.g. NBHM, BRNS, etc.
- f. They review doctoral thesis, journal papers etc.
- g. The faculty members serve as members of various educational bodies.

Faculty/ Staff Development Programmes	No. of faculty benefitted
Refresher courses	Colloquium and seminar programs are conducted by all CIs/OCC to bring experts from various organizations within the country as well as from abroad, to provide state-of-the art knowledge regarding developments in various fields.
UGC-Faculty Improvement Programme	
HRD Programme	
Orientation Programmes	
Faculty exchange Programme	
Staff training conducted by the university	
Staff training conducted by other institutions	
Summer/Winter schools, Workshops, etc.	
Others	

All the faculty of the Constituent institutions are engaged in improving their knowledge and skills in their specialized areas through participation in national and international conferences, symposia, and courses and various specialized fields of training in the national and international forums, scientific bodies and institutions.

2.14 Details of Administrative and Technical Staff

Category	Number of Permanent Employees	Number of Vacant Positions ¹	Number of Permanent Positions filled during the year	Number of Positions filled temporarily ²
Management and Administrative personnel	7		-	5
Technical & Support Administration Staff	15		-	6

HBNI along with the Constituent Institutions and one-Off Campus Centre have the required administrative and technical staff to manage the academic and related matters in the respective institutions. Each of the Constituent Institution has a Director, a Dean (Academic) for each major discipline, a Dean (Student Affairs), supported by the requisite administration and technical staff.

The Central Office at Mumbai is supported by a Vice Chancellor, Dean, Registrar, 3 Associate Deans, Chief Administrative Officer, Dy. Registrar, Finance and Accounts Officers, Administration Officer, Assistant Registrar, Assistants and other administrative staff.

¹All the staff are on the rolls of the BARC, a Constituent Institution of HBNI; however, this has the advantage that any vacancies that may arise can be filled by sourcing staff and personnel from BARC.

²In addition, for some routine services, such as data entry operations, printing and record keeping and IT enabled services, personnel are deployed on third party rolls.

CRITERION - III

3. Research, Consultancy and Extension

3.1 Initiatives of the IQAC in Sensitizing/ Promoting Research Climate in the institution

With the objective of promoting quality in education and research, the Institute has initiated a Colloquium program, inviting an eminent academician and scientist to sensitize all concerned engaged in such activities. For the current year, HBNI invited, Prof. Surendra Prasad, former Director IIT Delhi and Chairperson, NBA for the colloquium on “Doctoral Education: mentoring Scholars for the 21st Century” (held in June 2018). The lecture is also made available online.

With the aim to promote the research in the institute, HBNI has made available to the students a wide range of facilities ranging from table top set ups to mega science facilities such as research reactors, accelerators and tokamaks. Computational resources available to the faculty and students are quite extensive and the research scientists are encouraged to build the instrumentation needed for their research.

3.2 Details regarding major Projects

DAE has been pursuing R&D in nuclear science and engineering, including the advanced mathematics and theoretical computer science. Research and development by the R&D units of DAE provide valuable support to sustain and expand the indigenous nuclear power programme and to develop non-power applications of nuclear technology for use in industry, food and agriculture, healthcare and advanced research.

The research centres and aided institutions lay strong emphasis on frontline basic and applied research, supporting special technologies, and human resource development for sustained growth and establishing the strong linkages with the academic and research community as well as industries in the country. The HBNI serves as a facilitator for enhancing the accessibility of DAE’s R&D infrastructure and facility to research students from all over the country.

The DAE’s R&D activities are categorised into seven major programmes MP-1 to MP-7 as follows:

MP-1 Nuclear Power Programme [Stage 1]

- 1.01 PHWR (Pressurized Heavy Water Reactor)
- 1.02 LWR (Light Water Reactor)
- 1.03 Front End Fuel Cycle – Exploration, Mining & Ore Processing, Fuel Fabrication, Heavy Water Production
- 1.04 Back End Fuel Cycle – Reprocessing
- 1.05 Health, Safety and Environment
- 1.06 Waste Management

MP-2 Nuclear Power Programme [Stage 2]

- 2.01 Fast Reactor
- 2.02 Materials

- 2.03 FBR- Front Fuel Cycle (including fuel selection, Chemistry, fabrication, Sodium & related activities)
- 2.04 FBR – Backend fuel cycle
- 2.05 Repair & Inspection Technologies
- 2.06 FBR -Health Safety & Environment

MP-3 Nuclear Power Programme [Stage 3]

- 3.01 Advanced Heavy Water Reactor (AHWR)
- 3.02 Thorium Fuel Cycle
- 3.03 Other Thorium Reactor System
- 3.04 Accelerator Driven Sub-Critical Systems
- 3.05 Materials
- 3.06 Hydrogen Energy
- 3.07 Fusion Reactor

MP-4 Advanced Technologies and Radiation Technologies & their Applications

4A. Advanced Technologies and their Applications

- 4.01 Research Reactors
- 4.02 Accelerators
- 4.03 Lasers
- 4.04 Special Materials
- 4.05 Advanced Technologies
- 4.06 Special Programmes

4B. Radiation Technologies and their Applications

- 4.07 Isotope Processing
- 4.08 Agriculture
- 4.09 Food Processing
- 4.10 Health
- 4.11 Water
- 4.12 Industrial Applications

MP-5 Basic Research

- 5.01 Mathematics and Computational Sciences
- 5.02 Physics
- 5.03 Chemistry
- 5.04 Biology
- 5.05 Cancer
- 5.06 Synchrotrons and their utilization
- 5.07 Cyclotrons and their utilization
- 5.08 Fusion and other Plasma Technologies
- 5.09 Material Sciences
- 5.10 Interdisciplinary Areas of science and engineering
- 5.11 International Research Collaborations

MP-6 Research Education Linkages

- 6.01 Human Resources Development
- 6.02 Sponsored Research
- 6.03 Prospective Research Fund
- 6.04 HBCSE
- 6.05 Information Technology Application Development

3.3 Details regarding major Projects

The outlay for overall Research and Development in the CIs of HBNI are as follows:

Name of CIs	Rs. (in Crores)
BARC	588.5
IGCAR	149.2
RRCAT	101.5
VECC	65.2
TMC	139.3
IPR	63.5
SINP	288
IMSc	91
HRI	74
IOP	50
TOTAL	11,575

3.4 Details on research publications (2017- 2018)

CI-wise distribution of the publications

CI	Total Publications	Publications with HBNI affiliation	% of Total	Avg. Imp. Factor (IF 2017)	Highest IF
BARC	1832	386	21.07	3.083	36.917
HRI	139	41	29.50	2.913	7.780
IGCAR	465	77	16.56	3.265	9.661
IMSc	220	51	23.18	3.186	9.353
IoP	267	63	23.60	3.085	9.446
IPR	287	20	6.97	2.577	5.203
NISER	353	23	6.52	3.176	5.331
RRCAT	241	91	37.76	3.260	13.942

SINP	500	32	6.40	2.810	9.353
TMC	390	44	11.28	2.953	7.367
VECC	170	26	15.29	2.936	8.462

3.5 Details on Impact factor of Publications:

Highest Impact Factor	36.917
Lowest Impact Factor	0.283
Average Impact Factor	3.092

3.6 Research funds sanctioned and received from various funding agencies, industry and other organizations

Nature of the Project	Duration Year	Name of the funding Agency	Total grant sanctioned	Received
Major Projects				
Minor Projects				
Interdisciplinary Projects				
Industry sponsored				
Project sponsored by the University/ College				
Students research project <i>(other than compulsory by the University)</i>				
Any other (Specify)				

The R&D Centres of DAE are sanctioned projects as per the annual plans approved by the Government of India and the 5-year plans.

Each of the R&D centres has projects funded as per the project requirements. The students registered for the PhD and Master level courses are actively engaged to work in the funded projects with the supervision and guidance of Guides, mentors and seniors.

3.7 No. of books published	i) With ISBN No.	6
	Chapters in Edited Books	113
	ii) With ISBN No.	

Publication (during the last 5 years)

a) Number of publications of the Institution Deemed to be University, year-wise, for last 5 years, with details	2017 : 4864 2016 : 2313 2015 : 2275 2014 : 2411 2013 : 1875 Total (2013-2017) : 13738																
b) Cumulative impact factor of all faculties for the last 5 years	26225																
c) H-index of the Institution Deemed to be University from Scopus for the Assessment Period	2017 : --- 2016 : 197 2015 : 185 2014 : 174 2013 : 162																
d) Hi-index of individual from Scopus for the Assessment Period	The hi-index distribution is summarized as follows: - <table> <thead> <tr> <th>Hi-index</th> <th>No of faculties</th> </tr> </thead> <tbody> <tr> <td>Upto 10</td> <td>486</td> </tr> <tr> <td>11-20</td> <td>373</td> </tr> <tr> <td>21-30</td> <td>82</td> </tr> <tr> <td>31-50</td> <td>30</td> </tr> <tr> <td>51-75</td> <td>13</td> </tr> <tr> <td>76-100</td> <td>3</td> </tr> <tr> <td>101 and above</td> <td>1</td> </tr> </tbody> </table>	Hi-index	No of faculties	Upto 10	486	11-20	373	21-30	82	31-50	30	51-75	13	76-100	3	101 and above	1
Hi-index	No of faculties																
Upto 10	486																
11-20	373																
21-30	82																
31-50	30																
51-75	13																
76-100	3																
101 and above	1																

3.8 No. of University Departments receiving funds from

UGC-SAP
DPE

CAS

DST-FIST
DBT Scheme/ funds

Research Funding (during the last 5 years)

- i) With regard to funding from other agencies, HBNI is different from other universities. Funds for extra-mural research are provided by DAE and one agency for this purpose is Board of Research in Nuclear Sciences (BRNS). A significant part of the funding is for collaborative projects wherein faculty/scientist from CIs work as collaborators with principal investigators from universities. Through BRNS funds and expertise have been provided to set up several major facilities for research in universities and institutes in the country. Faculty and Scientists from CIs of HBNI are contributing towards running and use of these facilities.
- ii) With regard to consultancy, every member of the faculty in the R&D centres is recruited as Scientific Officer(s) and all the scientists are engaged in the projects assigned to them in the respective units, centres, which include projects that have application in industrial units of the DAE or for the possible deployment outside of the DAE. Faculty also works in various committees related to regulatory review of nuclear facilities. In case of other

3.16 No. of patents received this year (2016-17)

Type of Patent		Number
National	Applied	
	Granted	3
International	Applied	-
	Granted	
Commercialized	Applied	-
	Granted	-

3.17 No. of research awards/ recognitions received by faculty and research fellows of the institute in the year

Total	International	National	State	University	Dist.	College
	1+2+1	2+4+1	3+1			

1,2,3 Chemical Sciences: 7 faculty were conferred with awards from national and international institutions viz., Young Associate of Indian Academy of Science, NASI Platinum Jubilee Young Scientist Award, Metallurgist of the Year Award (by Ministry of Steel, GoI) Japanese Photochemistry Association Lectureship Award, Prof Suresh Ameta Award from ICS, CRSI Bronze Medal, Asia Pacific Academy of Materials, Binani Gold Medal, Indian Institute of Metals.

1,2,3 Mathematical Sciences: BM Birla Science Prize, Srinivas Ramanujan Memorial Award, and the Fellowship of Indian Academy of Sciences, Bangalore was received by Dr. Dishant Pancholi, Prof. Amritanshu Prasad and Prof. Chakraborty respectively.

**Details are as under:

IGCAR

- Dr. John Philip is a Member of Editorial Board of Infrared Physics and Technology, Elsevier, Netherland. Dr. John Philip is a Member of Research Council of CSIR-Central Glass & Ceramic Research Institute (CSIR-CGCRI), Kolkata.
- Ms. Jemimah Ebenezer was conferred Distinguished Woman in Engineering for the contribution and achievements in the field of Electronics Engineering at 3rd Annual Women's Meet-AWM 2018 conducted by Venus International Foundation, Chennai on March 3, 2018

NISER

- a. Amaresh Jaiswal, School of Physical Science, DST Inspire Faculty Award, (2017), DST, Govt. of India
- b. Bedangadas Mohanty, School of Physical Science, Elected as Fellow of Indian Academy of Sciences, Bangalore, (2017), IAS, Bangalore
- c. Ajaya Kumar Nayak, School of Physical Science, RAMANUJAN Fellowship, (2017)
- d. Bedangadas Mohanty, School of Physical Science, J C Bose National Fellowship, (2017), DST-SERB, Govt. of India; Elected Fellow of National Academy of Sciences, India, Allahabad, NASI, Allahabad; Utkalmani Yuva Prativa Samman-2017 in the field of Education, The Samaja', a Premier Odia Daily; Editor of International Journal of Modern Physics E, World Scientific Publishing; Elected Fellow of Indian National Science Academy, New Delhi (Effective 1st January 2017), INSA; Shanti Swarup Bhatnagar Prize for Physical Sciences (2015) CSIR, Govt. of India
- e. Victor Roy, School of Physical Science, DST Inspire Faculty Award (2016) DST, Govt. of India
- f. T. K. Chandrashekar, School of Chemical Science, SASTRA - CNR Rao Award (2016), SASTRA University
- g. Prof. Sudhakar Panda, J. C Bose National Fellowship, (2017), DST-SERB, Govt. of India.

SINP

- a. Prof. Susanta Lahiri, Hevsey Medal, 2015
- b. Dr. Rome Samanta, Newton Fellowship of Royal Society (2018)
- c. Prof. Gautam Bhattacharyya, J C Bose Fellow (2017)
- d. Prof. Gautam Bhattacharyya, Fellow of Indian Academy of Sciences, Bangalore, (2015)
- e. Prof. Sukalyan Chattopadhyay, Fellow of National Academy of Sciences, (2017)
- f. Prof. Munshi Golam Mustafa, Fellow of National Academy of Sciences, (2018)

HRI

Prof. Sumathi Rao, Outstanding Referee Award, American Physical Society (2017) and an Elected Fellow of Indian Academy of Sciences, Bangalore, 2017.

INSTITUTE OF PHYSICS

1. Prof. Sudhakar Panda has been awarded fellowship of IASc (2017) and J. C. Bose National Fellowship (2017).
2. Prof. Sikha Varma is a Member of the Editorial Board of Journal of Physics: Condensed Matter (JPCM), IOPscience, United Kingdom.
3. Dr. Sanjib Agarwalla has been awarded Associateship of IASc (2013), INSA medal for Young Scientists (2014), NASI Young Scientist Platinum Jubilee Award (2014), Simon Associateship of ICTP, Italy, for the period of 2015-2020, and NASI Scopus Young Scientist Award (Physics, 2016).
4. Dr. Aruna K. Nayak has been awarded Ramanujam Fellowship (2015).
5. Drs. Sanjib Agarwalla, Manimala Mitra, and Kirtiman Ghosh were awarded Inspire

Faculty Fellowship before joining IOP.

TATA MEMORIAL CENTRE

Dr. Kakoli Bose (Faculty)

National Women Bio scientist Award - 2015 (Young Category): Department of Biotechnology, Government of India: September 2016

Dr. S.V. Chiplunkar (Faculty)

Chairperson: Scientific Advisory Committee and Member, Research & Recognition Committee, MGM Institute of Health Sciences, Navi Mumbai: 2014-18

- Chairperson: Ad-hoc Board of Studies in Applied Biology, University of Mumbai, Mumbai: 2015-18
- Secretary, Mumbai Immunology Group: July 2009-2018.
- External Member on Senate: Indian Institute of Technology-Bombay, Mumbai: 2016
- Member: Internal Quality Assurance Cell, Homi Bhabha National Institute: 2016-18
- Member: International Union of Immunological Societies Education Committee 2016-18
- Member: Apex Committee on Environmental Health, The Ministry of Environment, Forest and Climate Change, Environmental Health Cell, Government of India, New Delhi: 2016-19

Dr. Abhijit De (Faculty)

Indian Patent final application and Trademark application: 'Photo-disintegrable, near-infrared responsive gold coated poly-(lactic-Co-glycolic acid) nanostructures and a process for its preparation: Final IPA no. 4082/MUM/2015, October 28, 2016

Dr. Shilpee Dutta (Faculty)

Dr Virendra Balkrishna Kamat Award for best oral presentation by a mid-level scientist: 'Radiation induced multinucleated giant cells formed by homotypic cell fusion undergo NHEJ repair to survive and generate recurrent glioblastoma cells' (oral presentation), 35th Annual Convention of Indian Association for Cancer Research, New Delhi: April 8-10, 2016

Dr. Arvind Ingle (Faculty)

President: Asian Federation of Laboratory Animal Science: 2017-18

Mr. Pratik Chandrani (Research Fellow)

First Prize: 'Discovery of actionable alterations in lung adenocarcinoma' (poster presentation) 1st Conference of Molecular Oncology Society - MOSCon 2016 - 'Decoding the genetics of common cancers in India', Pune: January 29-30, 2016

Third Prize: 'Discovery of actionable alterations in lung adenocarcinoma' (poster presentation) TMC Platinum Jubilee Celebrations Conference on 'New ideas in cancer – challenging dogmas', Tata Theatre, NCPA, Mumbai: February 26-28, 2016

Mr. Pratik Chaudhari (Research Fellow)

Nature Travel Award: 'Role of hemidesmosomal linker proteins in neoplastic progression of squamous cell carcinomas' (poster presentation), Gordon Conference on Intermediate Filaments, Stowe, USA: June 11-17, 2016.

Mr. Asif Amin Dar (Research Fellow)

First Best Poster Award: ‘Contribution of myeloid derived suppressor cells to immune suppression in oral tumor microenvironment’ (poster presentation), 13th FIMSA Advanced Immunology Course, Postgraduate Institute of Medical Education and Research, Chandigarh: March 17-19, 2016

Mr. Akash Dubey (Research Fellow)

Prof. AS Mukherjee Memorial Prize for Best Paper Presentation by young scientists in oral session: ‘Regulation of PRL-3 translation by plakophilin-3’ (oral presentation), XL All India Cell Biology Conference, Jiwaji University, Gwalior: 17-19 November 2016

Ms. Rasika Hudlikar (Research Fellow)

Smt. Mangala Bamne Award for Best Oral Presentation: ‘Modulation of tobacco carcinogen induced early molecular markers by various doses of polymeric black tea polyphenols (PBPs) in lung and liver of A/J mice’ (oral presentation), 35th Annual Convention of the Indian Association for Cancer Research, New Delhi: April 8-10, 2016.

Mr. Prajish Iyer (Research Fellow)

Poster Prize (US\$100 and 1-yr subscription of Nature Reviews Cancer): ‘Deciphering the diversity of somatic alteration and Salmonella infection in gall bladder cancer by whole exome sequencing’ (poster presentation), 2016 NextGen Genomics, Biology, Bioinformatics and Technologies (NGBT) Conference, Cochin: October 3-5, 2016

Ms. Prasanna Iyer (Research Fellow)

Second Prize for Oral Presentation: Does PtdIns4P effector – Vps74/GOLPH3 an oncogene affect Golgi size? 12th National Research Scholars Meet 2016, ACTREC, Navi Mumbai: December 15-16, 2016.

Ms. Nikhat Khan (Research Fellow)

First Prize for Oral Presentation: ‘Founder and recurrent mutations in MMR genes in the Indian Lynch syndrome families’ (oral presentation), Indian Cancer Genetics Conference 2016, ACTREC, Navi Mumbai: December 12-14, 2016

Mr. Piyush Kumar (Research Fellow)

Dayawati Rastogi Best Oral Presentation Award: ‘Raman spectroscopy of experimental oral carcinogenesis: investigating precancer changes due to confounding factors in controls’ (oral presentation), 6th International Conference on Perspectives in Vibrational Spectroscopy - ICOPVS 2016, Lucknow: November 5-8, 2016.

Mr. Rushikesh Patil (Research Fellow)

Travel Award: ‘ $\gamma\delta 17$ is a proangiogenic subtype of $\gamma\delta$ T cells and associates with poor survival of gall bladder cancer patients’ (oral presentation), 13th FIMSA Advanced Immunology Course, Postgraduate Institute of Medical Education and Research, Chandigarh: March 17-19, 2016.

DST Inspire Faculty Award (2017) DST, Govt. of India.

Ms. Maitreyi Rathod (Research Fellow)

Third Prize for Poster Presentation: ‘Prying the intracellular path controlling iodine pump protein localization and function in breast cancer cells’ (poster presentation), 12th National Research Scholars Meet, ACTREC, Navi Mumbai: December 15-16, 2016

Mr. Ram Kumar Singh (Research Fellow)

Second Prize for Best Poster: ‘Impact of JGF1R/Akt signaling on cancer stem cell heterogeneity and tumorigenicity’ (poster presentation) TMC Platinum Jubilee Celebrations’ Conference of ‘New ideas in cancer – challenging dogmas’, Tata Theatre, NCPA, Mumbai: February 26-28, 2016

Ms. Trupti Togar (Research Fellow)

Second Prize: ‘Genomic characterization of somatic alterations in cervical adenocarcinoma’ (poster presentation) 1st Conference of Molecular Oncology Society - MOSCon 2016 - ‘Decoding the genetics of common cancers in India’, Pune: January 29-30, 2016

3.18 No. of faculty from the institution who are PhD Guides and students registered under them

All the faculty of 10 CIs and Off campus Centre have students registered for PhD programmes in the respective disciplines and specializations.

3.19 No. PhD awarded by faculty from the Institution

For the year 2017-18, the PhD awarded is as under: 225 (covering all CIs/OCC)

3.20 No. of Research scholars receiving the Fellowships (Newly enrolled + existing ones)

JRF	SRF	Project Fellows	Any other
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All the students enrolled for the PhD programmes of HBNI in the Constituent Institutions and Off Campus Centre receive fellowships offered from the DAE or UGC-CISR fellowships.

3.21 No. of students Participated in NSS events:

University level	----n.a-----	State level	-----
National level	-----	International level	----n.a-----

3.22 No. of students Participated in NCC events:

University level	-----	State level	-----
National level	-----	International level	----n.a-----

3.23 No. of Awards won in NSS:

University level	-----	State level	-----
National level	-----	International level	----n.a-----

3.24 No. of Awards won in NCC:

University level -----

State level -----

National level -----

International level -----n.a-----

Extension activities organized

University forum **X** College forum **X** NCC NSS Any other

Major Activities during the year in the sphere of extension activities and Institutional Social responsibility

CRITERION – IV**Infrastructure and Learning Resources****4.1 Details of increase in infrastructure facilities**

Facilities	Existing (Sq.m.)	Newly created	Source of funds
1. Campus Area			
a) BARC	8500000		
Built up Area	3500000		
b) IGCAR	5600000		
Built up Area	66000		
c) RRCAT	6790000		
Built up Area	100000		
d) VECC	60000		
Built up Area	122000		
e) SINP	16.57 acres		
f) IPR,	50 acres		
g) IOP	0.227 million sq. ft.		
h) HRI	66 acres		
i) TMC	-		
j) IMSc	28152 sq. ft.		
k) NISER	300 acres		
2. Classrooms			
a) BARC	10 (capacity 30 nos.)		
	4 (LH 70 nos.)		
b) IGCAR	11 class rooms		
c) RRCAT	5 Lecture halls		
d) VECC	2 nos.		
e) SINP	4 CR 1 studio, 1 LH		
f) IPR	2 CR		
g) HRI	6 CR		

h) TMC	3 Seminar room 4 LH, 3 Meeting room, 1 Board meeting room		
i) IMSc	9 CR		
j) NISER	32 CR		

**newly created shall not be applicable for the year of 2017-18.*

3. Laboratories [Given as above]

4. Seminar Halls [Given as above]

5. Important equipment purchased during the year

Research facilities in Physical Sciences:

- o Dhruva reactor, 14UD Pelletron accelerator, Iron beam facility at 6MeV Folded tandem Ion Accelerator (FOTIA)
- o Crystal growth systems: Czochraski and Bridgman and Molecular Beam Epitaxy
- o Wide range of characterization facilities: SEM, TEM, XRD, XPS, SIMS, AFM, Kelvin probe, I-V measurements, impedance spectroscopy etc.
- o A wide range of spectroscopic facilities: High resolution FTS, FTIR, UV-Vis, Raman, photoluminescence etc.
- o Wide range of thin film deposition facilities
- o A number of state-of-the-art beam lines at INDUS, Indore, e.g., Photo-physics, High Resolution Ultraviolet, ARPES, AIPES, EXAFS (dispersive and scanning), Protein Crystallography, EDXRD etc.
- o Laser cooling and ultra-precision spectroscopy facility
- o State of the art laser and laser spectroscopy facility
- o EBPVD, ECR-PECVD, RF Plasma processing system
- o High end computational facility for design of materials
- o High end computational facility for design of materials

Research facilities in the area of Chemical Sciences:

- o Pulse radiolysis Facility with 7MeV LINAC
- o Femtosecond Transient Absorption, Fluorescence Up-conversion & Laser-Induced Breakdown Spectroscopy Set up Coherent Control facility
- o GC, GC-MS and Raman Spectroscopy set-up
- o GAS Phase & Surface Dynamics Lab+741ratory
- o BET surface area analyser
- o Stopped flow spectrometer with absorption, fluorescence and circular dichroism detector
- o Laboratory for the preparation of Ultrapure Material
- o SEM (scanning Electron Microscope) with EDX (Energy Dispersive X-ray Spectra) & Atomic Force Microscopy
- o Various XRD facilities

- o Various spectrophotometer: ICP-MS, ICP-AES, AAS, ESR, TOF MS, TI MS, GD-MS & Photo-acoustic, FT NMR
- o Positron Annihilation Spectrometer
- o Ultra-trace analytical laboratory
- o Electrochemical & elemental analyzer
- o Solid oxide fuel cell laboratory
- o Laboratory for hydrogen energy research
- o Laboratory for solar energy: photovoltaic and photocatalysis
- o High end computation facility for theoretic chemistry
- o Laser laboratory for atmospheric chemistry

Research facilities in the area of Life Sciences:

- o Radiation sources for research in radiation biology, mutation breeding, food irradiation: Co-60 and Cs-137 based gamma sources (including BHABHATRON), proton beamline at FOTIA, alpha irradiator, X-ray and electron beam facilities,
- o Next-generation DNA sequences, DNA fragment analyzers, DNA/RNA microarray and protein chips, Real-time PCR equipment
- o Fluorescence activated cell sorters and flow cytometers.
- o SEM, SEM-EDX and TEM facilities, EDXRF and XRD facilities
- o Crystallisation robot and X-ray and NMR-based structural biology facility
- o Confocal and Fluorescence Microscopes, Atomic Force Microscope
- o MAKDI-ToF-MS, ESI-LC-MS, GC-MS facilities for proteomics and metabolomics
- o ICP-MS and AAS and Ion electrodes for metal determinations
- o Surface Plasmon Resonance and CD spectrometers, UV-Visible absorption and fluorescence spectrometers, FT-IR and FT-NMR facilities
- o Ultracentrifuges and high-speed centrifuges for sub-cellular fractionation and molecular separations
- o Fermentors, growth monitoring stations and incubator-shakers for microbial and cell cultures
- o Bio-informatics facilities
- o Animal and Plant Tissue culture facilities, including animal house and green house
- o Agricultural field at Trombay, Tarapur, Vizag campus, Gauribidnur for crop improvement programs

Research facilities in the areas of Health Sciences:

- o Radiotracers for diagnosis and therapy of a variety of diseases including advanced imaging equipment like state of the art PET-CT facility, gamma camera with SPECT system and an advanced radionuclide therapy ward
- o In house Medical cyclotron facility for Research and development of PET and Radiopharmacy laboratory for SPECT radiopharmaceuticals for diagnostic and therapeutic Nuclear Medicine.
- o Research facilities to understand the pathophysiology of thyroid diseases including thyroid cancer, tuberculosis, the use of antioxidants to mitigate radiation induced damage following radionuclide therapy, development of immunoassays for thyroid disorders and diabetes.
- o Equipment for research in radiation dosimetry, quality assurance, patient dosimetry, development of radiological standards and related aspects of medical physics.

Research facilities in the areas of Engineering Sciences

- o A wide range of well-equipped workshops for fabricating and instrumenting experimental set ups
- o Laboratories for stress analysis, heat transfer, vibration and balancing, robotics and remote handling,
- o Laboratories for material testing and characterizing including equipment like SEM and TEM
- o Electronics, instrumentation, signal processing and control laboratories
- o Many large scale experimental set ups such as loops for heat transfer studies, desalination studies, type testing etc. are made and commissioned as and when required,
- o Electromagnetic Forming/Welding Equipment,
- o Radiological laboratories for testing irradiated samples and for hot fabrication,
- o Solar plants
- o Extensive facilities in the area of computer science that has enabled BARC to develop parallel computers

4.2 Computerization of administration and library

- (i) An administration in the University, CIs/OCC are managed through a unique Institute Integrated Management System (IMS) that connects CIs and for academic matters, Student affairs including student's annual progress, minutes of Doctoral Committees and their development activities in the research.
- (ii) The library information service of all CIs/ OCC have access to the modern amenities such as journals/ e-journals, e-resources, digital library, state of art RFID, self-check in / check out, Web OPAC system, e-reference services and specialized subscription to journals, CAS and publication services.
- (iii) All the Libraries in the CIs / OCC have modern facilities such as computer cell/ Audio, video facilities with internet access 24X7 e-resources for student learning and Wi-fi enabled facility.
- (iv) Along with modern amenities, certain conventional facilities such as inter-library borrowing facility, making availing relevant topics, references, citations, index impact factors, authenticity of journals bibliographic services on report online/ offline is also provisioned as per learner requirements.

4.3 Library Services

	Existing No.	Newly added*	Total*
a) BARC			
Text books	87092		
e-books	6677		
Journals	1116		
e-journals	928		
Magazines	15000		

Others	Remote access to online resources		
b) IGCAR			
Books	70000		
Journals	815		
e-journals	DAE consortium e-journals, scientific/ bibliographic databases, e-books, IGC publications & full text resources. In addition, IGCAR is part of ELSEVIER consortium.		
Magazines	As included above		
Others	45000 back volumes 195000 Reports 15000 standard collection 3 Tier based digital library		
c) RRCAT			
Books	15381		
Journal	125		
e-journal	3476		
Others	12		
Magazines	6		
d) VECC			
Books	7899		
Journal and Magazines	6860		
e-journals	89		
Others			
Conference proceeding	1286		
Standard	2193		
Reports	350		
CD/ DVD etc.	180		

Thesis / Dissertation	85		
e) SINP			
Books	36216		
e-books	2610		
Journals	250		
Magazines	3012		
f) IPR			
books	10325		
Journals	16047		
e-journals	83		
Magazines	23		
Others	As available		
g) HRI			
Books	20743		
Journals	37089		
e-journals	158		
Magazines	10		
h) TMC (Parel Campus)			
Books	7975		
Journals	174		
e-journals			
Kharghar campus			
Books	5872		
Journals	83 (subscribed) and back volumes 12595		
e-journals	51		
Science direct	2398		
Clinical key	677		

Books	1135		
First consult	837		
Drug monography	2956		
Proceeding consult	354		
Magazines			
Ovid SP journals	16		
Books	38		
i) IMSc			
Books	72602		
Journals	405		
e-journals	6000		
Magazines	14		
NISER			
Printed books:	15000 (approx.)		
Electronic books	8000 (approx.)		
Electronic Journals	2500 (approx.)		
Databases	06		
CD/ DVDs	250 (approx.)		

**existing and total remains the same for the year*

4.4 Technology up gradation (overall)

The technology (IT, ICT and computer & peripherals) for administration, management, student services during the classes and outside the classes have been enabled in a robust manner.

The individual CIs are wi-fi enabled with secured systems and the centres are computerized with state of art computer infrastructure and high-speed connectivity.

The training school hostels are also wi-fi enabled for access to resources for all time study and research purposes. In addition, there are facilities for a central computer centre available for student to access and continue research at their time and pace.

The IT and Computer resources are upgraded annually along with the software systems that may be needed for meeting the research and administration requirements.

4.5 Computer, Internet access, training to teachers and students and any other programme for technology upgradation (Networking, e-Governance) etc.

Networking & e-Governance: The HBNI has established a centralized portal for the managing the communication and creation of student records through a unique e-filing processes i.e., an Integrated Management System” which comprises of student records, mark transcripts, copies of degree, progress reports of students for all the courses the student has pursued while in the institute.

All the CIs/ OCC can access the information and update the progress of the students online and view the updates.

Secured Examination System: The examination systems in the CIs are streamlined with the introduction of online password protected question papers, direct printing through dedicated printing machine (on a secured platform), a monitoring system for tracking the receipt of the results, instant online communication to the students of the updated results. Online generation of mark sheets, transcripts ensuring data integrity and instant computations and communications.

ICT enabled teacher training: With the respective BoS approving the online courses under NPTEL, students now can undertake courses upto prescribed number for credits for the respective discipline areas.

Various faculty and disciplines have made recording their lectures and making them available online for students and researchers outside HBNI as well. E-patashala has number of such courses for students to get access and information.

4.6 Amount spent on maintenance:

- i. ICT
- ii. Campus infrastructure and facilities
- iii. Equipment (lab & related R&D facilities)
- iv. Others

The resources relating to ICT, campus infrastructure, lab equipment and related R&D facilities and e-governance are purchased and installed following the needs, requirements specific to R&D centres and grant-in-aid institutions following the regulations of the Govt. of India. Accordingly, the maintenance of the equipment and devices follows such of the Government regulations.

It is estimated that approximately 10-15% of total cost of equipment, devices, computers and peripherals, related equipment and resources are spent on annual maintenance across all CIs/OCC. In addition, where applicable, replacement of spares is undertaken as per the annual maintenance.

CRITERION –V

5. Student Support and Progression

5.1 Contribution of IQAC in enhancing awareness about Student Support Services

- (i) IQAC has been discussing the quality parameters needed across all programmes of study in HBNI and concurrently CIs/OCC are undertaking such measures in enhancing the awareness of students.
- (ii) The Quality parameters are being discussed in the Standing Committee of Deans for creating a transparent process and at the same time enhance student awareness at various stages of their support requirements.
- (iii) The annual progress and key decisions of the IQAC are presented to the Council of Management, which is the apex body of the Institute.

The IQAC outcomes have enabled emphasizing certain quality parameters for student and research outputs, which provided enhancement of foreign travel assistance. The students now have better opportunities to present their researches in several international scientific forums relevant to their specialties.

5.2 Efforts made by the institution for tracking the progression

The students graduating from the Constituent Institutions and Off Campus Centre are tracked from the R&D centres they are employed. Each of the CIs/ OCC have their Alumni Cells, which maintain information on the graduated students.

An informal gathering of the graduated students take place in the CIs/ OCC periodically as per their plans, wherein they share their progress, achievements and success in their professional career.

5.3 Student Strength

(a) Total Number of Students : 3200

Integ. MSc (at NISER)	MSc (Engg.)/ MTech/ MD/ MSc Nursing/ MSc Clinical Research	PhD/ Int. PhD/ DM/ MCh.	Others – PG Diploma, CFP
132	225	1500	43

- (b) No. of students outside the state: More than 60% students enrolled are from other states.
- (c) No. of international students: NIL*

**The Government is considering to extend training in nuclear sciences and engineering where such need arises, the same shall be extend as per the government policy.*

Last Year						This Year					
General	SC	ST	OBC	Physically challenged	Total	General	SC	ST	OBC	Physically challenged	Total

5.4 Details of student support mechanism for coaching for competitive examinations (IF any)

Not Applicable

5.5 No. of students qualified in these examinations

Not Applicable

NET		SET/ SLET		GATE		CAT	
IAS/ IPS etc.		State PSC		UPSC		Others	

5.6 Details of Student Counselling and Career Guidance

A significant number of students of HBNI are already employed in the respective CIs/OCC. Of the remaining, a major fraction of students pursue higher education/ Post Doc/ RA positions in select international Institutions/ Universities, after completing the program in HBNI. In the case of research-based degrees, this essentially depends on the type of research topic chosen and finding opportunity available in such Institutions. To this extent the PhD guide/ thesis supervisor guides supports to secure placement in suitable position relevant in their specified research areas.

NISER, an OCC of HBNI conducts placement for all graduates and Post graduates through its full-fledged placement cell and a team. Students are guided by the placement coordinator reach out to industries for placement. The NISER has set record in the same. The Tata Memorial Centre conducting PG level courses in Nursing and super specialty in medical and health related areas are directly absorbed through direct recruitment in the leading hospitals requiring such super specialty disciplines in Government and Private corporate Hospitals and they are paid well as per prevailing market trend. They are also guided by their mentor through spreading news in the annual meetings, research conferences and such other meetings of the seniors.

5.7 Details of campus placement

The professional courses are run by HBNI and their Constituted Institutions, the placement records are as under:

- (i) MTech & PGD in BARC Training Schools. 100% placement in R&D Centres of DAE.

- (ii) Diploma in Radiological Physics and Diploma in Medical Radioisotope Technique. MSc Nursing. These students are employed in specialized R&D Centres and Hospitals.
- (iii) MD/ DM & MCh.: The super specialty courses conducted in CI-TMC are in the areas of oncology and are absorbed in leading / specialized hospitals across India upon completion of course requirements.

5.8 Details of gender sensitization programmes

HBNI and CIs/OCC are fully supported by the DAE and follow the guidelines of the Government of India, for the gender sensitization. Accordingly, the Institute has in place such programme to sensitize all the stakeholders in the ecosystems about the gender awareness in the campus, which are cordial as per the Government guidelines.

5.9 Students Activities

5.9.1 No. of students participated in Sports, Games and events

Students of HBNI and CIs/ OCC participate in various sports, cultural, library, nature clubs and such other committees. They organize annual events, sports and cultural as per their academic calendar. All support is being extended to them for organizing such events through student mentors and Dean Student Affairs.

Each of the CIs have indoor games, sports and cultural clubs which organize such events within the campus. The students are engaged in annual hostel day celebrations, institute day, swachata abhiyan, clean campus campaign, new year eve celebrations, Ganapathi Utsav, colloquium on science topics, health matters, popular science talks, invites lectures on Science Day, Yoga Day, Republic day, Independence Day, Literary Club, Dance, Drama and Film club and such other events.

State/ University level	National level	International level
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No. of students participated in the cultural events

State/ University level	National level	International level
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5.9.2 No. of medals/ awards won by students in Sports, Games and events

State/ University level	National level	International level
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No. of students participated in the cultural events

State/ University level	National level	International level
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5.10 Scholarships and Financial Support (for 2017-18)

	Number of Students*	Amount
Financial support from institution	All the students registered for PhD have the financial support from the DAE following the Govt. of India guidelines and other statutory bodies.	
Financial support from government		
Financial support from other sources		
Number of students who received International/ National recognitions		

5.11 Student organized initiatives

The students in all the CIs/ OCC are actively engaged in the national/ international level scientific forums, meeting and conferences for exchange of ideas and theme-based research. They are generally mentored and guided by the Centre Director and PhD guides.

5.12 No. of social initiatives undertaken by the students

Clean & Green Campaign in the CIs: The students at PG level are engaged in Swacchata Abhiyan, planting tree sapling on the notified days of the year to commemorate their contributions to the country. These activities help inculcate a habit for conservation of environment and natural resources. All the students of the CIs take this initiative annually.

Promotion and Popularization of Science Education Programmes by students of CIs: a large number of students in the CIs actively participate in training and education programme to the undergraduate and post graduate during the summer vacation and regular projects during the final year of the science programme being pursued by students of other university, colleges etc. They even train students for 1-year project leading to preparation of a project report in the chosen topics. The number of such trainee students are in large numbers to the extent of more than 200 to 1000. Select CIs also conduct summer students visitor programme for a duration of 6 weeks, students sponsored and supported by INSA also take part in such activities.

The students are also engaged in organizing popular science lecture for school students either within the CIs or in their school campus.

National Science Day/ National Technology Day: The students in the CIs are actively engaged in National Science Day and National Technology Day programme celebrated as per their programmes. On such occasion, eminent scientists are invited to deliver lectures and students from regional schools, colleges are also invited to participate in the events. Students are actively take part in organizing training for participating in the Science Olympiads.

5.13 Major grievances of students (if any) redressed: Not Applicable

There are no major grievances from the students received for the year.

CRITERION –VI

6. Governance, Leadership and Management

6.1 State the Vision and Mission of the institution

VISION

The vision of HBNI is:

- To provide an academic framework for integrating basic research with technology development
- To encourage inter-disciplinary research
- To nurture an environment of attracting high quality manpower in sciences including engineering sciences to take up career in nuclear science and technology related areas

MISSION

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.

Guided by the vision, mission and objectives, HBNI's activities the value proposition of the Institute is to

- Always adhere to the highest ethical standards and put good of students first
- Value excellence in research and foster innovation and creativity
- Recognize importance of science for the development of the society

The role of HBNI is to nurture in-depth capabilities in nuclear science and engineering and to serve as a catalyst to accelerate the pace of basic research and facilitate its translation into technology development and applications through academic programs, viz., Master's and Ph.D. degrees in Engineering, Physical, Chemical, Mathematical, Life and Health Sciences while encouraging inter-disciplinary research. Additionally, a Strategic Studies program has also been identified to ensure availability of adequate qualified human resources to address issues pertaining to nuclear law, economics of nuclear power, nuclear security, nuclear proliferation, intellectual property rights etc.

6.2 Does the Institution has a Management Information System?

HBNI has in place a MIS for connecting the Central Office with the CIs/OCC regarding the student information, progress for their academic and research credentials and their inter related activities including their publication. In addition, Institute Management system is in place for managing of the academic and administration of activities in the Institute.

6.3 Quality improvement strategies adopted by the institution (for each parameters):

6.3.1 Curriculum Development

(a) Curriculum Design and Development procedure

The university follows a systematic process for the design and the development of curriculum for various academic programmes, which are explained below.

MTech /MSc (Engg)/MPhil

The curriculum development for the programmes is carried out by a subcommittee of experts constituted for this purpose by the subject-specific Training School Committees (TSC). The TSCs base their recommendations on evolution (or introduction of new) of DAE programmes during the period since the last review and feedback from students. The report of the subcommittee is reviewed by the respective TSC. The revised syllabus incorporating the recommendations of the TSC is then forwarded to the Board of Studies (BoS) of respective discipline for final ratification. This process is carried out once in three years on a holistic basis. However, minor modifications if required are carried out on a case by case basis in an ongoing manner and duly ratified in the meetings immediately following the revision by the two committees as state above.

DipRP/ DMRIT/ DFIT

These programmes come under Board of Studies in Medical and Health Sciences and to conduct this programme a Standing Academic Committee has been constituted in BARC/TMC. Any revision to the syllabus is approved first by the standing committee and then by the BoS. The syllabus went through a major revision recently as a result of a report of a committee specifically appointed for this purpose.

MD/ MCh/ DM

Conduct of these programmes including any revision of syllabus is managed by the Board of Studies in Medical and Health Sciences and the guidelines of the Medical Council of India. The BoS meets periodically and deliberates on the recent trends, development and introduces new subjects that may be needed to improve the knowledge and skills of medical practioners in the domain areas.

MSc (Nursing)

Conduct of these programmes including any revision of syllabus is governed by Board of Studies in Medical and Health Sciences and the guidelines of the Nursing Council of India.

PhD and Integrated PhD

Course work part of the programme is designed and approved by CI level academic committees and approved by BoS. Additionally, Student specific doctoral committees look into the requirements of individual students and prescribe additional courses which have to be taken as self-study courses. Syllabi for such courses are tailor made.

With regard to the MSc part of the programme, the curriculum is designed by the faculty based on current national and international trends in Masters level education in Physics and Mathematics. It is then run through Board of Studies and their feedback is incorporated before finalizing the curriculum. Student feedback is taken both during the course as well as at the end of the course and based on that and feedback from instructors.

Course structure as well as content is incrementally updated. The feedback process is monitored and implemented by the Graduate committee of the Institute.

MSc (5-Year Integrated)

This programme is conducted only at NISER. The course structure of the programmes is designed by the experts consisting of eminent scientists in the field and frozen for a minimum of 3 years. The syllabus for individual courses in any program is proposed by the faculty and submitted to the Under-Graduate Committee of the School (UGCS) of the respective school. It is discussed and sent to Undergraduate Committee of the Institute (UGCI) and then sent to the Academic Council. The Academic Council of NISER meets once in every 3 months. Finally, it is discussed and approved by the Under-Graduate Board of Studies of HBNI. Once approved it is included into the course curriculum as a core course or elective for the students to choose following Choice Based Credit system.

(b) Details of the academic flexibility

MTech Programme offered at BARC Training Schools has one year of course work and one year of project work. The course work has three modules: foundation courses, core courses and electives.

A PhD student has to choose courses related to research to be pursued by the students. The student does get the option of self-study courses in many cases. Doctoral students are encouraged to enrich themselves by taking up courses beyond mandatory one year of course work to broad base their knowledge. Such courses could be in the form of self-study courses, open seminars or minor R&D project.

Credit accumulation and transfer facility is available to doctoral students in some of the CIs. In particular employees do earn credits towards course work prior to formally enrolling for a doctoral programme. Some of the CIs run courses after office hours for employees.

Lateral and vertical mobility within and across programmes, courses and disciplines: A student joining Training School was earlier given the option of first enrolling for a PG Diploma and then upgrading it to MTech if desired by him/her. Finding that all engineering from academic year 2013, engineering students were advised to enroll for MTech and science students were advised to continue to enroll for a PG Diploma. Options for change over are still available. The PhD students are allowed to change the topic of research. It is possible for a student having MSc in a science subject to enroll for PhD in engineering provided s/he is working in an applied area. The reverse, where a student having a BTech joins doctoral programme in physics or mathematics is also possible.

Revision of syllabus is done with the involvement of stake holders. Interaction with stakeholders is a continuous process.

For BARC Training School programmes, there is an Apex Committee to look at all affairs and consists of faculty members as well as senior scientific officers. Apex committee provides valuable guidance in framing and revising syllabi. The Apex

committee is assisted by discipline specific committees. Elective are introduced in Training School to meet emerging requirements.

At IMSc, a review of the existing courses in physical sciences is currently underway and is expected to be implemented shortly.

At IoP, syllabus was discussed and revised in 2004 and in 2014. In 2014, subject details were revised by about 20%. As plasma science is an evolving subject, the syllabus at IPR is under constant improvement. Also for most of the students, who join the institute, the subject of plasma science is a new area and so the course covers basics of plasma physics and advanced courses. Some courses improved and taught recently are Magneto-hydrodynamics, Fusion Physics, Non-linear dynamics and Laser – Matter interaction.

TMC-ACTREC

Syllabus of courses taught to doctoral students during one year of course work is reviewed by senior faculty. Feedback from students is also considered. Based on the ongoing research interests and the projects undertaken by the students, topics like Cancer Genomics, In vivo Animal Imaging, Biophysics and structural biology, stem cell biology, Raman spectroscopy and bioinformatics have been added to the course work during the last few years.

6.3.2 Teaching and Learning

Doctoral students are encouraged to enrich themselves by taking up courses beyond mandatory one year of course work to broad base their knowledge. Such courses could be in the form of self-study courses, open seminars or minor R&D project.

Similarly, MTech, students during one-year course in training school are given mini projects to be carried out under the guidance of senior scientists. The project work is evaluated by a committee. The evaluation procedure includes a presentation by the students also visit various nuclear installations as a part of their course of work. Students from Health Sciences practice in hospitals as a part of their academic programs. Viz. MD/ DM/ MCh/ Nursing etc.

6.3.3. Examination and Evaluation

All the CIs follow the system of two semesters and a summer semester pattern of study phase concluded by a end-semester examination. Two rounds of examinations are held in both the semesters and there is one round of examination in summer semester. Such examination pattern makes it close to continuous evaluation system. In addition to the examinations, assignments are given to the students by many course instructors and evaluated periodically. All doctoral courses conducted by CIs/OCC follow semester systems. HBNI expects a doctoral thesis to be a significant original and independent contribution to knowledge in a chosen field of study and be of such lasting value as to merit publication. It should demonstrate an ability to select an important problem and deal with it completely including an ability to effectively communicate what has been achieved through the research activity. It should be short, not longer than 300 pages. PhD evaluation process followed by HBNI has the following key steps:

- A general comprehensive examination in the beginning of the PhD programme to evaluate the broad-based knowledge of the students
- Periodic progress reviews by the students' specific doctoral committees
- Pre-synopsis seminar
- Permission to submit the thesis only after the student has published in peer reviewed journals and number of publications required depending on the discipline and topic
- Thesis evaluation by 2-external reviewers, preferably one reviewer from abroad
- Final public viva voce examination by the doctoral committee along with one external examiner

6.3.4 Research and Development

The Research and Development by the CIs/ OCC provide valuable support to sustain and expand the indigenous nuclear sciences and engineering programme across the DAE R&D Centres in the country. They are also engaged in the non-power applications of nuclear technologies for use in industry applications, agriculture and food, medical, health care advanced research. All the research undertaken by the CIs/ OCC have strong community linkages.

The R&D undertaken by the CIs/ OCC are the primary mission of the DAE mandate. The researches undertaken across the R&D centres are peer reviewed by external eminent experts and the annual progress reports are discussed in their respective apex management bodies.

The R&D centres have their mechanism to conduct annual reviews of the research works, outputs and application undertaken. Each of the units fine tune their research focus and outputs following the annual review feedbacks so obtained.

6.3.5. Library, ICT and physical infrastructure/ instrumentation

The library, ICT and related infrastructure including the R&D equipment instrumentation already available in the CIs/ OCC are latest technology and latest as available as per the current trends.

The Libraries are equipped as per latest specifications and every effort has been made to make available e-journal, digital scientific publications on the click of the mouse for the students and faculty to access at all times. All the labs, student residences are wi-fi enabled which allow students to access such information as per their time and duration.

On ICT enabled resources, HBNI has facilitated making available the NPTEL, SWAYAM and e-patashala the virtual lectures and technology enabled lectures for access to the DAE ecosystem. As part of making this a practice, the HBNI Ordinance also allow sourcing such courses and earn credits on self-learning basis.

All the R&D centres/ Units within the CIs/ OCC have state of art lab equipment and instrumentation for undertaking research in the specialized fields. The research fellows have option to undertake/ conduct part of the research in one or more of the research establishments as part of the thesis. Similarly, students of the medical and health sciences practice in a hospital as part of their PG and research programmes.

6.3.6 Human Resource Management

The quality improvement strategies in human resources across all the CIs/ OCC are focused to meet the intended objectives of the R&D centres and activities are surrounded to achieve these objectives as per the plans. In achieving this, the CIs/ OCC have the following in place:

Faculty Empowerment Strategies: All the faculty members have excellent academic and research credentials and many of them have fellows of prestigious academies as well. With the objective to encourage faculty in R&D, they are encouraged to publish in the peer reviewed journals and participate in the national/ international conferences. Faculty members are also encouraged to pursue post-doctoral research, thus there are allowed to avail such facility in the national and international institutions with the aim that they bring value addition research in their areas.

The faculty are also encouraged to participate in the international collaborative research projects for Example, CERN, ITER, FERMI Lab etc. Faculty are also allowed to pursue research through extramural grants available with other DAE institutions viz., BRNS etc.

With the objective to bring in quality perspectives and trends to other peer institutions, the HBNI faculty also serve on the governance bodies, academic bodies and such other statutory bodies of various educational institutions.

The research fellows also extended foreign travel assistance for presenting their research work and publication in the national and international scientific for a, symposium with the support of DAE/ HBNI grants. They have ample opportunity to interact with their international peers and exchange ideas.

Conducive Green Living campus & facilities: The campuses of all the CIs/ OCC are spread in vast sprawling green campus with all modern amenities for the living of faculty and their family. They are self-contained with all amenities including children education until the higher secondary level. The school is affiliated to CBSE and quality education is being imparted to them. The campus has hospital, market place and community centre for all social gathering and such events.

The campus is also eco-friendly where possible have adopted such technologies of bio-gas, waste utilization/ recycling processes and water recharge resources as per the needs of the regional requirements and statutory provisions.

All the campuses are equipped with adequate sports and recreation facilities for use of the staff, faculty and members in the colony.

Faculty Promotion Policies: The promotion policies for the faculty are fair and transparent, which are based on the merit based. The individuals are appraised annually and interviewed for promotions in accordance with the set procedures (approved by the apex body). The merit-based promotion schemes have ensured that the performers are able to move up and not merely based on the seniority.

The grant-in-aid institutions have well formulated promotions for the faculty, which are decided basis the Promotion Committee comprising of internal and external

experts, which are again based on the performance and recommendations of the experts (peers) through letters.

6.3.7 Facility and Staff recruitment

All the faculty are recruited following the Central Government guidelines and norms following the DAE requirements.

The HBNI has total of 1048 permanent faculty members across all the CIs/ OCC. However, 19 faculty are working as contractual/guest/ part-time faculty. Hence, the proportion of permanent faculty is greater than 98% of total faculty members (Permanent + Contractual) taken altogether.

All faculty members are well qualified with most of them having PhD. The faculty members of the Institute have excellent research credentials. About 100 members of faculty and scientists of CIs are the fellows of prestigious academies.

In the Grant-in-aid institutions of the DAE (except in one of the CIs, i.e., IPR). A faculty is recruited through an open advertisement and an interview. Care is taken to choose only those who have qualifications in the emerging areas. In case of a R&D institution, recruitment is done as Scientific Officer and after they obtain PhD and requisite experience they are considered for selection as faculty member following a stringent procedure. IPR follows a mixed practice of the above two.

6.3.8 Industry Interaction/ Collaboration

With regard to consultancy, situation is again different from other universities. Every member of the faculty in R&D centers is recruited as a scientific officer and they are engaged in projects assigned to him/ her that includes projects having application in respective industrial units of the DAE or for possible deployment outside of the DAE. This is true for IPR as well.

Faculty are members of various committees for the regulatory matters for the review of nuclear research, safety and related facilities. In case of other institutions, faculty work on large research projects and their involvement is comparable to industrial consultancy.

6.3.9 Admission of Students

- i. A meritocratic admission policy with predefined minimum standards are followed. It has two steps as follows;
- ii. National level test (On line or Off-line)
- iii. Interview by a Committee appointed by Head of the CIs/OCC.

For different courses number of centres is different. For low applicant/ intake courses centre is mainly at the CIs. For high applicant/intake courses centres are at National level. The no. of examination centres for the year 2017 for OCES, NEST, JEST is 62,123 and 39 respectively.

6.4 Welfare schemes

The campus in the R&D Centres of the CIs/ OCC are provided with residences for majority of the staff and faculty. These government accommodations are in the vicinity of the Institutes.

There are welfare schemes for medical as per the government regulations, guidelines, including their family is also covered under the Contributory Health Services Scheme. A family welfare scheme following the government of India scheme is also applicable to them.

The campuses also have school education for their kids and kith of all faculty and staff members.

6.5 Total corpus fund generated

The HBNI is a grant-in-aid institute of the Department of Atomic Energy, Govt. of India. The mandate to generate corpus fund is still under consideration by the parent department. The Institute has been seeking IPR on the research products it has founded.

6.6 Whether annual financial audit has been done Yes [] No

6.7 Whether Academic and Administrative Audit (AAA) has been done?

	External*		Internal	
Audit Type	Yes/ No	Agency	Yes/ No	Authority
Academic Administrative			YES	Academic Council**

* The University within the DAE system is an approach to harmonize the education and research activity with the concurrent system of mission mode research, health & safety measures, systemic approaches to several statutory processes for adherence of policy related matters. These approaches and systems still allow the HBNI to formalize a system for such as process.

** The Academic Council has ensured several measures to be adhered for the purpose of quality improvement, increasing the relevance of curriculum, enhancing the effectiveness of research, making research skills an important aspect during the rigorous academic curriculum at the PG level and research. One of the key aspect includes the operations and conduct of various activities by the Board of Studies. The Board of Studies is responsible for quality of research, the type of publications, faculty improvement and recognition and related activities. The Academic Council becomes the monitoring and assessment body for these activities. The Conveners of the Board of Studies present the annual academic reports (each year) and the members provide critical comments for its improvement. Thereby the internal authority for academic and administrative audit is being conducted by the Academic Council.

6.8 Does the University/ Autonomous College declares results within 30 days?

For UG Programmes	Yes	No	Not Applicable
For PG Programmes	Yes [<input checked="" type="checkbox"/>]	No	

Yes, the University declared results within 30 days of conduct of end semester examinations.

6.9 What efforts are made by the University/ Autonomous College for Examination Reforms?

The examination reforms relate to being more transparent and be pro-student needs and to enable this, the CIs of HBNI has instituted online platform for design and conduct of examination including the announcement of results to the students. The issue of transcripts for the students in the CIs are also enabled through this platform.

- (i) HBNI has a policy of providing flexibility with regard to the conduct of examination and the pattern.
- (ii) The general structure consists of course evaluation based on home assignments, mid-term examinations and final examinations.
- (iii) The pattern of examinations (mid & final) is vested with the faculty and instructors. These examinations can range from closed book, closed notes exams, open book and indefinite exams. Clearly this has helped in tapping the creative potentials among the students.
- (iv) The results are generally announced within 2-weeks, the grades are published and communicated to the students.
- (v) While for the Doctoral students, every care is taken to complete the evaluation processes in the specified time frame as laid in the PhD guidelines. Exemptions of the Chairperson, Academic Council shall be sought as per the thesis requirements to complete the evaluation and conducting viva voce examination.

6.10 What efforts are made by the University to promote autonomy in the affiliated/ constituent colleges?

HBNI does not have affiliated or constituent colleges. The Constituent Institutions are extended arm of HBNI only.

6.11 Activities and support from the Alumni Association

All the CIs of HBNI have Alumni Association, the main objective is to improve the communication and interaction with the present and former students. Most of the CIs have mentoring of students which has been primarily enabled through these initiatives. They have been mentoring the community and extension related activities in the CIs.

6.12 Activities and Support from the Parent – Teacher Association

The programmes offered in the CIs are at the post graduate level and primarily the interaction with the parents of the students happen as per needs and demands, as the CIs are dealing with matured students who are capable of putting their perspective as per the requirements. Efforts through Alumni are also made to actively interact with parents.

6.13 Development programmes for support staff

The support staff are guided to undertake short courses conducted by the Govt. of India institutions in a variety of areas such as RTI, purchase procedures, managing the staff personal

matters as per the rules and regulations of the govt. of India announced time to time, and education management courses conducted by IIMs etc. with the aim to upgrade their skills and knowledge in office management.

6.14 Initiatives taken by the Institution to make the campus eco-friendly

- (i) Every year on National Environment Day on 5th June, tree plantation drive is being undertaken, in addition to the maintenance of the minimum mandated green space are maintained as per the CPWD, CPCB norms.
- (ii) The campus manages horticultural services covering the ornamental and flowering plants as needed in the campus.
- (iii) The organizations supporting the role of HBNI/ CIs its core activities in the campus are also mandated to undertake related activities on such occasions with the aim to increase the awareness of the key stakeholders.

CRITERION - VII

7. Innovations and Best Practices

➤ Innovation on University System

The concept of creation, establishment and the academic programmes of the HBNI itself is an innovation to India in the higher education sector mapping. The HBNI as a research university is helping to use the research infrastructure and faculty for human resource development without any significant additional investment. In turn the DAE derives the benefit of research outcomes from the post graduate and doctoral students for its programmes.

The unique academic model where research and research outputs coexist for actual day to day activities do not exist in India, to further add one such university exist in Japan named Sokendei, which is a Japanese acronym for Graduate University for Advanced Studies, Japan.

➤ Innovation on Teaching Approaches and Practices

The Institute has always been open to use of modern methods of teaching learning and research practices. Towards achieving the objective, the faculty across all the CIs/ OCC have adopted the use of simulators, dynamic reactor models and interactive boards to enhance the learning experience. The use of such practices has been well received by the students, researchers and practitioners as elicited from them using the student feedback mechanisms.

The teaching community and faculty of the institute is self-motivated and dedicated lot and the nomination of a specialist to the teaching processes is by itself considered as recognition of merit. However, in acknowledgement of the fact that appreciation and formal recognition are necessary towards the sustenance of any such teaching and research system, a mechanism to award meritorious and innovative teachers is in the process of formulation stage.

While all the classroom is enabled with ICT systems, with the support of DAE, HBNI has initiated e-patashala, where in lectures of HBNI and CIs/ OCC are put online for students of other universities to have access at any time and learn at their pace. Which is similar to the NPTEL of the MHRD.

The best practice of HBNI Governance System is briefly illustrated below section 7.3.

7.1 Innovations introduced during this academic year which have created a positive impact on the functioning of the institution. Give details

Research Scholars' visit to facilities of other nuclear establishments within the purview of HBNI: Research scholars are now encouraged to visit other R&D Centres of DAE for study tour, taking up courses as per their needs. This has enabled student gain additional knowledge and learn from peers in another establishment.

Research Scholars meet: A first time, IGCAR planned an activity wherein PhD fellows organized an event to share scientific thoughts in a variety of areas and share ideas across the disciplines. In the meet they also invited experts from other national institutes and eminent expert in the field and share ideas.

Technology Enabled Learning/ e-Lectures/ ICT lectures national MOOC platform: HBNI has now enabled students to learn from the national MOOC platform using NPTEL contents, e-patashala and SWAYAM. The students can now self-learn using this platform and earn credits.

7.2 Provide the Action Taken Report (ATR) based on the plan of action decided upon at the beginning of the year.

PLAN OF ACTION	ACTION TAKEN REPORT (ATR)
Curriculum Design & Delivery	<p>Practical based learning along with the theoretical papers using the versatile experimental facilities are available.</p> <p>The Board of Studies have adopted a measure to ensure appropriateness of the academic content consistent with high standards and uniformity across the CIs/ OCC.</p> <p>The BoS has also incorporated the latest worldwide development and breakthrough while the revision of the curriculum.</p> <p>The same was reported in the Annual Academic Report & presented in the Academic Council meeting.</p>
Use of ICT teaching methods	<p>With the aim of taking advantage of the vast experience of the senior faculty members and infrastructure facilities in the CIs/ OCC, the students have been given flexibility to have choice of courses from across the CIs/ OCC and institution of eminence such as IITs, where such expertise is available.</p> <p>HBNI has signed MOU with IIT Kharagpur and Punjab University.</p> <p>With the concurrence of the faculty members, the selected lectures are recorded and the same is now made available online for in-house use and students of other universities and institutes can have access through e-patashala (an online lecture portal of HBNI)</p>
Examination & Evaluation system in CIs/ OCC	<p>With the aim of being transparent and flexibility, the CIs/ OCC have adopted a uniform system of assessment and evaluation for the end-semester examination.</p> <ul style="list-style-type: none"> • The assessment is continual based as the courses are also undertaken in other CIs. • The theoretical examination papers comprise of suitable mix of objective and subjective questions and the evaluation is done on absolute basis

	<ul style="list-style-type: none"> • Questions are designed to test the analytical ability of the student and not merely his memory.
Faculty Development Initiatives	<p>The faculty across the CIs/ OCC take part in the national and international events such as symposium, conferences, scientific meeting and such forum to showcase their research work.</p> <p>Faculty members are also encouraged to take up post-doctoral research to enhance and expand their knowledge base and research skills.</p> <p>The promotion of faculty is purely based on merit.</p>
Alumni Cell and Extension Activities	<p>CIs have set up Alumni Cell and they are engaged in mentoring students in their campus for scientific and other extension activities.</p> <p>All the CIs have announced set of extension and environmental awareness activities and such other scientific and related activities.</p>

7.3 Give two Best Practices of the Institution (please see the format in the NAAC self-study Manuals) Provide the details in annexure (annexure need to be numbered as i, ii, iii etc.)

The best practice of HBNI Governance System is briefly illustrated hereunder:

(i) Distributed System of Governance:

HBNI has adopted a unique distributed system of academic governance across its CIs/OCC. For example, the Dean(s) Academic of the CIs/ OCC are responsible for handling the assessment and evaluation of thesis as per the ordinances and communication with the external examiners and finally conducting viva voce examination may also be handled smoothly.

One of the key aims of the decentralization is that the assessment and evaluation of the thesis shall be completed as fast as possible, which shall enable the students to move forward in their career. The thesis, oral examination for the students are conducted at the CI level with spirit and vigor as laid down in the ordinances.

(ii) Incentives to Students:

Participation in international conferences: PhD fellows of HBNI are given foreign travel assistance for participation in the international scientific forum, symposium, meetings for presentation of their research. This is one of the opportunity for young researchers to interact with peers at the international forums.

Facilitation to use infrastructure in all CIs/OCC, take up coursework in any other CI (or) institutes having MoU with HBNI.

The programmes offered in the CIs/ OCC are very unique with focus to nuclear sciences, engineering and technology covering a variety of areas viz., physical, chemical, biological sciences, engineering and related areas. The student registered for

a course at the Master's and PhD are allowed to undergo courses in other CIs/ OCC or with institutions HBNI has MOU including the IITs, Central institutions etc.

This is very rare opportunity where students have access to plethora of research facilities to undertake research as per the intended objectives and plans.

7.4 Contribution to environmental awareness/ protection:

All institutions of DAE are extremely conscious about environment as can be seen from the greenery on the campuses. At the Trombay campus of BARC, a Nisurgaruna plant has been operating to generate to process waste generated in the kitchen. It generates cooking gas and also manure.

A water harvesting scheme has also been implemented in the Trombay campus. For disposal of hazardous chemical waste, a plant in the planning stage at the BARC campus.

The Chemistry laboratories encourage use of 'green chemistry' methodologies. A Nisurgaruna plant to process kitchen waste is being installed at RRCAT.

Tree planting and growing of flowers is given special emphasis on all campuses and this has resulted in beautiful ambience in the campuses. Tree cover attracts birds. Greenery of IoP attracts hundreds of migratory birds every winter when they are on their way to the Chilka lake of Odisha.

As part of environmental monitoring programme, studies on physiochemical, biological and geochemical characteristics of coastal environment (water, biota and sediment) were conducted at IGCAR to meet MoEF (Ministry of Environment Forests & Climate Change) regulation. Results of the studies on biofouling organism, phytoplankton, zooplankton and fish diversity in the coastal water indicated high diversity and high density indicating the healthiness of the Kalpakkam coastal environment. Among antifouling paints screened, one was found suitable for use at MAPS water intake gate. Results of studies on dissolved heavy metal in Kalpakkam seawater indicated that the coastal water is not polluted with heavy metals. A new fish species to the world of fishery science has been identified and named as *Scolopsis igcarensis*, in recognition of IGCAR's contribution to marine diversity study.

Water quality studies on ground water samples from Kalpakkam region were carried out for fluoride and nitrate content, fluoride content were below permissible limit, however, nitrate contents were beyond the limit in some of the areas. Ambient air quality monitoring at different places of IGCAR was continued to meet MoEF and AERB requirements.

At TMC (Kharghar Campus), a biogas plant is installed that processes kitchen waste. Biological and toxic waste is collected separately for disposal. Vermi-culture is practiced on the campus that generates manure. The animal facility has solar heating panels that provide hot water. The campus has several medicinal plants and trees.

7.5 Whether environment audit was conducted? Yes No

Conducted as per the mandate.

7.6 Any other relevant information the institution wishes to add (for example SWOT Analysis)

PLANS FOR NEXT YEAR	INITIATIVES (PROPOSED)
Quality Improvement Strategies	
(i) Curriculum Design & Delivery	Nuclear law and security, Humanities for engineering and science students, new specialization in MD courses
(ii) Flexibility in the Curriculum	Addition of more elective courses for the choice of students Online based courses
(iii) Multi-disciplinary courses	Courses related to Applied Management Systems for Nuclear Technology areas
Innovations and Best Practices	Improved systems of academic governance
	Improve/ promote large number of inter-disciplinary research projects and opportunities to work on high end experimental facilities
	Online platform for Student management system/ e-filing system and progress monitoring as per laid procedures of the course guidelines
Student centric best practices	
	Student Support Services
	Placement & Alumni cell & their functions
	Extension & Outreach activities in the CIs
	Organization of Workshops/ conferences/ National Research Scholars Meet

Name:

Name:

Signature of the Coordinator, IQAC

Signature of the Chairperson, IQAC

Abbreviations used in the Report:

AQAR	:	Annual Quality Assurance Report
BARC	:	Bhabha Atomic Research Centre
BoS	:	Board of Studies
CAS	:	Career Advanced Scheme
CAT	:	Common Admission Test
CBCS	:	Choice Based Credit System
CE	:	Centre of Excellence
COP	:	Career Oriented Programme
CPCP	:	Central Pollution Control Board
CPE	:	College with Potential for Excellence
CPWD	:	Central Public Works Department
CI	:	Constituent Institution of HBNI
DAE	:	Department of Atomic Energy
DPE	:	Department with Potential for Excellence
GoI	:	Government of India
GATE	:	Graduate Aptitude Test
HBNI	:	Homi Bhabha National Institute
HRI	:	Harish Chandra Research Institute
IMSc	:	Institute of Mathematical Science
IoP	:	Institute of Physics
IGCAR	:	Indira Gandhi Centre for Atomic Research
IPR	:	Institute of Plasma Research
IQAC	:	Internal Quality Assurance Cell
MoEFCC	:	Ministry of Environment Forest and Climate Change
NET	:	National Eligibility Test
NISER	:	National Institute of Science Education & Research
NPTEL	:	National Programme on Technology Enabled Learning
OCC	:	Off Centre Campus of HBNI
OGCE	:	Oral General Comprehensive Examination
PEI	:	Physical Education Institution
RRCAT	:	Raja Ramana Centre for Advanced Technology
RTI	:	Right to Information Act
SAP	:	Special Assistance Programme
SF	:	Self Financing
SLET	:	State Level Eligibility Test
SINP	:	Saha Institute of Nuclear Physics
TEI	:	Teacher Education Institution
TMC	:	Tata Memorial Centre
UPE	:	University with Potential Excellence
UPSC	:	Union Public Service Commission
VECC	:	Variable Energy Cyclotron Centre



HOMI BHABHA NATIONAL INSTITUTE

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