

**Evaluative Report of the Centre for Nanoscience and Nanotechnology
(July 2009 – June 2013)**

1. Name of the Department : **Centre for Nanoscience & Nanotechnology**

The Centre for Nanoscience and Nanotechnology (CNSNT) was established to impart high quality education and conduct cutting edge interdisciplinary research in emerging areas of nanoscience and nanotechnology. The CNSNT is offering M.Tech degree and PhD degree: The research oriented M.Tech. programme in Nanoscience and Nanotechnology was started in 2005 in the University Centre for Instrumentation Micro-electronics (UCIM). Being the first course of its kind in northern part of the country, it was a challenging job to have undertaken. In 2008 the course was placed under the newly formed Centre for Emerging Areas in Science and Technology (CEAST). Currently it is run by Centre for Nanoscience and Nanotechnology under University Institute for Emerging Areas in Science and Technology and is hosted in Department of Physics of Panjab University.

2. Year of establishment : **2005**

3. Is the Department part of a School/Faculty of the university? : **Yes, Faculty of Science.**

4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters, Integrated Ph.D., D.Sc., D.Litt., etc.): **PG, Ph.D**

Name of the programme	Specialization	Duration	Full time/part time
M.Tech in Nanoscience and Nanotechnology	-	2 years	Full time
PhD in Nanoscience and Nanotechnology	-	-	-

5. Interdisciplinary programmes and departments involved: **NIL**

6. Courses in collaboration with other universities, industries, foreign institutions, etc.: **NIL**

7. Details of programmes discontinued, if any, with reasons : **NIL**

8. Examination System: Annual/Semester/Trimester/Choice Based Credit System: **SEMESTER**

9. Participation of the department in the courses offered by other departments : **Faculty members of this department are guest faculty for Centre for System biology and bioinformatics, PU.**

10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others)

	Sanctioned	Filled	Actual (including CAS & MPS)
Professor	01	-	
Associate Professors	01	-	
Asst. Professors	05	01	
Others	-	-	

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance :

Name	Qualification	Designation	Specialization	Experience (# of years)	No. of PhD/ M.Phil. students guided for last 4 years
Prof. V. P. Singh	PhD	Coordinator	Mass Spectrometry & Geochromology	40 ½ years
Dr. Gaurav Verma	PhD	Co-coordinator	Materials, polymer nanocomposites coatings		02 (ongoing)
Dr. Navneet Kaur	PhD	Assistant Professor (Regular)	Nanochemistry	07	01 (completed) 11 (ongoing)
Dr. Richa	PhD	Assistant Professor	Nano materials based biosensors	03

Rastogi Thakur		(Temp)	for healthcare applications		
Dr. Nishima	PhD	Assistant Professor (Temp. and Inspire Faculty)	Design & synthesis of metallic and semiconducting nanoparticles, peptide chemistry, immunodiagnostic applications of nanomaterials	4.10.2012 till date	01 (ongoing)
Dr. Savita Chaudhary	PhD	DST Inspire faculty	Micelles and microemulsions, physical and nonochemistry.	12.10.2012 till date
Dr. Parveen Kumar	PhD	DST Inspire faculty		

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors:

Adjunct Faculty:

- (i) Prof. Alok Srivastava, Department of Chemistry
- (ii) Dr. Gaurav Verma (Co-coordinator), University Institute of Chemical Engineering & Technology
- (iii) Prof. O.P. Katare, University Institute of Pharmaceutical Sciences
- (iv) Dr. S.K. Tripathi, Department of Physics
- (v) Dr. Sonal Singhal, Department of Chemistry
- (vi) Prof. Sukesh Chander, Department of Biochemistry
- (vii) Dr. Sunita Srivastava, Department of Physics

13. Percentage of classes taken by temporary faculty – programme-wise information:

M.Tech: 30%

14. Programme-wise Student Teacher Ratio : 8:1

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual :

Category	Number of Permanent Employees	Number of Vacant Positions	Number of permanent positions filled during the Year	Number of positions filled temporarily
Administrative Staff	3	1	-	1
Technical Staff	-	-	-	-

16. Research thrust areas as recognized by major funding agencies:

Use of nanomaterial in chemosensors and biosensors, nanoparticles in immunodiagnosics, carbon nanotubes and their healthcare applications, metallic nanoparticles for pesticide and contaminants detection, design of polymer nanocomposites (DST, UGC).

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise:

S No	Funding Agency	Project	Total grant
1	DST	Design and synthesis of polymeric receptors for ion recognition studies (PI: Dr. Navneet Kaur)	27 lakhs
2	India-Korean Joint Project (DST-ROK)	Design and synthesis of quantum dot-based benzimidazole-coupled chemosensors. (Co-PI: Dr. Navneet Kaur)	Exchange visits
3	DST-INSPIRE	Gold nanoparticle based targeting of pesticides in food and water (PI: Dr. Nishima)	35 lakhs
4	UGC Start up grant	Design, synthesis and application of nanoparticle as bioprobes (PI: Dr. Nishima)	6 lakhs
5	DST-SERB	Nanoparticle Mediated Targeting of Bacteria using Cell Penetrating Peptides (Co-PI: Dr. Nishima)	32 lakhs
6	DST-INSPIRE	A Hybrid Metal-Semiconductor	35 lakhs

		Heteronanostructure Core–Shell Nanoparticles with Geometrically Tunable Optical Properties and Their Applications as Optoelectronic Devices (PI: Dr. Savita Chaudhary)	
7	UGC Start up grant	“Investigating the function of Luminescent Lanthanide-Functionalized Metallic nanoparticles in organizing the size stability, optical properties and associations with proteins for impending sensing relevances in aqueous medium” (PI: Dr. Savita Chaudhary)	6 lakhs

18. Inter-institutional collaborative projects and associated grants received :

S No	Funding Agency	Project	Total grant
1.	India-Korean Joint Project (DST-ROK)	Design and synthesis of quantum dot-based benzimidazole-coupled chemosensors. (Co-PI: Dr. Navneet Kaur) In collaboration with IIT ropar and Yonsei University (S. Korea)	Exchange visits

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.:NIL

20. Research facility / centre with

- state recognition : Nil
- national recognition : Nil
- international recognition : Nil

21. Special research laboratories sponsored by / created by industry or corporate bodies:
Nil

22. Publications:

* Number of papers published in peer reviewed journals (national / international) :**37**
in last 5 years

*Chapters in Books :**2**

*Edited Books :**Nil**

* Books with ISBN with details of publishers :

- 1) **A. Quantum Dot Sensors: Technology and Commercial Applications. Chapter 5: Quantum Dot Probes Based on Energy Transfer Mechanisms, John F. Callan, Bridgeen McCaughan, Colin Fowley, Narinder Singh, Navneet Kaur, and Suban Sahoo, Pan Stanford Publishing, 2013. (ISBN-10: 9814316008; ISBN-13: 978-9814316002)**
- 2) **B. Role of Metallic Nanoparticles in targeted drug delivery systems. Savita Chaudhary, Shikha Lohan and S.K. Mehta. In Recent Developments in Biotechnology, published by Studium Press LLC, USA.**

* Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.) : **37**

* Impact Factor: – range / average : **1.5- 6.3**

* h-index :- **of department is 7.0**

23. Details of patents and income generated: **N.A.**

24. Areas of consultancy and income generated : **N.A.**

25. Faculty selected nationally / internationally to visit other laboratories / institutions/ industries in India and abroad: **N.A.**

26. Faculty serving in

- a) National committees :
- b) International committees :
- c) Editorial Boards:

The department faculty is involved in reviewing the national and international peer-reviewed research journals.

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

- a) The faculty at the Assistant Professor level doing Refresher and Orientation courses in their streams.
- b) The faculty is also encouraged to take part in workshops, seminars etc. to enhance their teaching and technical skills.
- c) The faculty is facilitated to learn computer-based instrumentations.

28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects : 90%
- percentage of students doing projects in collaboration with other universities industry / institute : 10 %

29. Awards / recognitions received at the national and international level by
- Faculty :**Dr. Nishima was awarded with Prof.U.C.Pant Memorial award in chemistry (2013)**
 - Doctoral / post doctoral fellows :N.A.
 - Students :N.A.
30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any. :
31. Code of ethics for research followed by the departments :
Punctuality, sincerity towards the system and the research work done by the researchers as per the Supervisor's consents. They are also assigned teaching duties and maintaining the decorum of the research lab.
32. Student profile programme-wise:

Name of the Programme	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
(refer to question no. 4)					
M.Tach. (Nanoscience & Nanotechnology (1 st year 2011-2013)	131 Approx.	17	20	100	100

33. Diversity of Students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
<i>M.TechNanscience & Nanotechnology (2011-2013)</i>	30%	60%	10%	

34. How many students have cleared Civil Services and Defence Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.
NET -01
GATE-01

35. Student progression

Student progression	Percentage against enrolled
UG to PG	NA
PG to M.Phil.	NA
PG to Ph.D.	5%
Ph.D. to Post-Doctoral	We have recently started with Ph.d programme.
Employed	
<input type="checkbox"/> Campus selection	
<input type="checkbox"/> Other than campus recruitment	80%
Entrepreneurs	15%

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	60%
from other universities within the State	-
from universities from other States from	40%
Universities outside the country	-

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period : N.A.

38. Present details of departmental infrastructural facilities with regard to

- a) Library : On sharing with Physics department.
- b) Internet facilities for staff and students : Yes
- c) Total number of class rooms: On sharing with Physics department.

- d) Class rooms with ICT facility : Nil
- e) Students' laboratories: sharing with Physics department.
- f) Research laboratories:sharing with Physics department.
39. List of doctoral, post-doctoral students and Research Associates
- a) from the host institution/university : 03
- b) from other institutions/universities : 10
40. Number of post graduate students getting financial assistance from the university: Nil
41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology. N.A.
42. Does the department obtain feedback from
- a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?
Yes, All issues related to teaching-learning-evaluation are discussed at the departmental meetings on a regular basis.
- b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?
The subject teacher gets feedback on curriculum, teaching-learning process etc from students on a regular basis. All issues related to teaching-learning-evaluation are discussed in a comprehensive manner.
- c. alumni and employers on the programmes offered and how does the department utilize the feedback?
Department is in touch with some of the alumni through personal contacts as well as social network. They offer suggestions for the improvement of the curriculum as well as teaching-learning-evaluation
43. List the distinguished alumni of the department (maximum 10): **This is a new department. It will take time for department to earn name and fame in the country.**
44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.
- ❖ Tutorials, Computers, Internet information technology, Audio-video aids, Computer aided packages.
 - ❖ Multi-media facilities are utilized in class room lectures. New experiments have been introduced in postgraduate students. Faculty is involved in developing methods and techniques for popularizing science.
 - ❖ By problem solving sessions and mid-semester examination and the end semester examinations

45. List the teaching methods adopted by the faculty for different programmes.

Teaching methods includes:

- ❖ Lectures;
- ❖ Demonstrations;
- ❖ Discussions;
- ❖ Student presentations;
- ❖ Group projects; and
- ❖ Guest speakers from institutes.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

Research scholars and faculty participated in CHASCON programme for the last five years through oral and poster presentation. Faculty periodically visits various institutes.

47. Highlight the participation of students and faculty in extension activities.

Department faculty and students actively participate in Seminars, Group Discussions etc.

48. Give details of “beyond syllabus scholarly activities” of the department:-

The students are sent to other institutes for training and collaborative research activities. Students also went abroad to attend workshop and conferences by getting funding through DST and other external funding agency.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.

NA

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

The faculty member(s) of the centre have reviewed a large number of research manuscripts submitted to various peer reviewed journals of international repute, served as experts for thesis defense examinations, served as paper setter for other universities, served as resource person in faculty development programs/seminars, which were supported by UGC.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strengths: *Publications, Research Projects, faculty's personal achievements.*

Weaknesses: *shortage of teaching as well as administrative staff, lack of equipment for the experiments, lack of special funds for equipments and instrumentations.*

Opportunities and Challenges

Recruiting faculty in the frontiers of Nanoscience & Nanotechnology is the need of the hour. Then the department shall be in a position to take up new challenges in the frontier area of Nanoscience. The M.Tech (Nanoscience & Nanotechnology) course should be designed to attract good talent and turn them into first rate researchers.

The challenge before the department is to keep pace with the expanding horizons of scientific knowledge, through judicious recruitment of faculty and to impart basic knowledge to M.Tech. students so that they can take up Research as a career. Starting of the Ph.D. Program is also the need of the hour. The Ph.D. students should be trained to take up new research problems which have scientific and social relevance.

52. Future plans of the department.

The department is eagerly looking forward shift to new building which will boost the basic experimental research due to availability of research labs. This will enable to train large pool of young researchers in modern nanotechnology. The Centre collectively, shall strive not just to maintain but improve the high standards set so far, of producing technically competent students and quality work in frontier areas of research.