

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY
ACADEMIC AUDIT (2020 - 2021)
PROFORMA OF ASSESSMENT

1. Name of the Department: Physics

Reviewer (Name, Designation & Address):

1. Dr. Ashavani Kumar, Prof. NIT Kurukshetra –External Expert
2. Dr. J.S. Dhillon, Coordinator IQAC cell & Dean Academics
3. Dr. H.R. Ghatak-Member(Prof) -Member
4. Dr. Mandeep Ghai-Member
5. Dr. K.S. Mann, Prof (Phy) & HOD Nominee
6. Dr. M.M. Sinha, HOD (Physics)- convener

Date of Review: 31.08.2021

NOTE:

- i. Please grade in the box provided for the following parameters in the range of 1-10 with 10 being the highest.
- ii. Leave 'blank' for 'No Comment'.
- iii. Kindly give your opinion on the strength and weakness of the Department and your suggestions for future growth.

A. ACADEMICS

A.1	ICD Program	Score		Remarks
		Self-assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility), Theory/practical (contents/ratio).	7		-Curriculum is structured through BOS meeting (which includes external experts and is held once every two years) to cater the need of the students to understand the concepts of Physics at early stage of technical education. -No flexibility is there in the curriculum. -All the practicals are designed keeping correlation with theory in mind both for PH-111 and PH-121, however the same may be re-looked into in future to have even better correlation.

2.	Equivalence and Relevance of curriculum at national level	8		On comparing with 'Model Curriculum for Diploma courses in Engg & Tech 2019' of AICTE, it is found that physics curriculum is almost equivalent and relevant at National level.
3.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects (minor/major)]	8		Academic load per week is L=4, T=0 and P=2 for both PH-111 and PH-121.
4.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	8		Continuous evaluation process comprising of Minors, majors, assignments, quizzes/viva etc. is being followed for theory/practicals.
5.	Tour/Training/Industrial visits/Internship opportunities provided during the year	6		There is as such no internship offered by the department, however basic hands-on training related to the experiments in the laboratory is imparted through the latest audio/video teaching learning modes.
6.	Effectiveness of Assisted Learning, Tutorial System for ICD Students/ Seminars (Refer Course File)	6		Partially assisted learning process has been undertaken, which needs to be strengthened by introducing additional tutorial to interact with the students effectively to enhance their knowledge.
7.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	8		Faculty mentoring is available via SMS/TGS/Class counselling running at the institute level.
8.	Practical activities, non-academic and totally related to a specific trade for skill development and <i>developing expertise in a particular group of techniques.</i>	8		Being a common course, physics laboratory helps the students in developing the particular skills especially for measuring the physical quantities among all the students irrespective of their branch of study in engineering.
9.	Linkage of ICD programs to outcome based vocational education (Industry linkage)	6		Students are trained in using fundamental measuring instruments (e.g. Vernier Calipers, Screw gauge, Spherometer etc.) useful in various industrial applications.
10.	Availability of workshop type lab/laboratory for providing hand on training to the students for skill development	8		Hands on training to the students in physics laboratory is provided Regularly.
	Total Score (out of 100)	73		

	UG Program	Score		
		Self-assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility)	7		the course syllabi are common to all branches of engineering, but needs to be revised as per requirement of Various disciplines of engineering tech. & AICTE norms.
2.	Status of study material developed by faculty for students	9		Department's faculty has been developing and updating the study material from time to time for both theory and practical.
3.	Relevance of contents of courses taught to the students and scope of improvement (revision of syllabus, addition of new experiments)	7		Limited relevancy of course content exists due to common course for all branches of engineering. From time to time syllabi has been revised and new experiments have been added accordingly.
4.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	8		Academic load/week is L=3, T=1 and P=2.
5.	Modern teaching methods in practice other than the conventional methods E-Assisted Learning (i) Availability of Library Resources (ii) Multi-Media Assisted Teaching	8		Difficult to apply modern teaching methods because of limited availability of required teaching tools.
6.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation) (i) Theory and tutorial (ii) Practical (case studies)	7		Due to large group of students proper student teacher interaction is inadequate and needs to be improved tutorials and practical.
7.	Faculty–Student Interaction (Whether any slot is fixed for the students to interact with a teacher, after classes/labs)	7		No particular slot exists in the central time table; however individual teachers generally interact with the students and pay individual attention during scheduled class itself.
8.	Tour/Training/Industrial visits/Internship opportunities	8		Being a basic course, physics laboratory trains the students in using various measuring instruments (e.g Vernier calipers and screw gauge) etc. which are useful in the industry. Also during the physics lab, the students learn to verify some of the physical laws.

9.	Effectiveness of Assisted Learning in Tutorial classes/seminars for Students	2.5(5)		Due to large class size, conducting tutorial class is not so effective.
	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	3.5(5)		From time to time HOD physics advises the faculty to further strengthening the teaching-learning process
10	Placement %age/higher studies options (last three years)	10		----
Total Score (out of 100)		77		

PG Program (Separate for each program)		Score		
		Self-assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility)	7		Course syllabi/content is almost as per directions of UGC however choice based system cannot be implemented due to shortage of faculty members.
2.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	8		Weekly load on students is L=20, T=4 and P=8 and in last semester (4 th) some of the students have to complete the project work.
3.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	8		Evaluation process has been done as per institute rules and regulations.
4.	Relevance of contents of courses taught to the students and scope of improvement	8		Course content is almost as per directions of UGC. Scope for improvement exists and hence from time to time syllabi is being revised by holding BoS meeting once in two years.
5.	Modern teaching methods in practice other than the conventional method E-Assisted Learning i. Availability of Library Resources and Major Search Engines (like Scopus, Web of Science) ii. Multi-Media Assisted Teaching	8		The central library of the institute makes some e-resources available. Multi-media assisted teaching has been implemented effectively. Some of the contents developed by departmental faculty is available online also.
6.	Technical Societies/ Colloquium for Students i. Departmental Society ii. Student Chapter(s) of Professional Societies	6		Physics society had been established in 2018 and is working till date.

7.	Tour/Training/Industrial visits/Internship opportunities	7		Tours to educational/technical institutes (like IIT Ropar, IIT Delhi etc.) used to be organized during previous year but during 2020-2021 it could not be planned due to COVID scenario.
8.	Collaboration with other departments (within institute)	7		Collaboration with various departments (chemistry, food, mechanical) exists
9.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	8		Class counsellor/ project teacher mentors the students as and when required.
10.	Monitoring and continuous evaluation of the project work assigned to the students (mechanism)	8		Continuous evaluation by individual teacher for project work is done on almost daily basis. However, at departmental level 2 presentations are held to monitor the student's progress.
Total Score (out of 100)		75		

A.4	Doctoral (Ph.D) Programmes	Score		
		Self-assessment	Expert assessment	
1.	Intake of Ph.D Students	5		No student was admitted during 2020-21. It may be noted that 4 students had appeared for SET entrance exam in July/Aug-2020, but no-one could qualify it as per UGC norms. During even semester no exam was conducted due to COVID scenario.
2.	Admission Process	8		Students are admitted through SET/NET/GATE. Interview of qualified students is held at the departmental level and after that the students are admitted on the basis of overall merit.
3.	Pre-Ph.D Courses and Evaluation Process	8		Pre-Ph.D course comprises of two subjects Research Methodology and Research related subject. Continuous evaluation process is there as per institute norms.
4.	Breadth and Depth of Knowledge of Students	7		To test the breadth and depth of student's knowledge entrance test/interview are held before the admission.
5.	Seminar/ Presentations and Technical Communication	7		Two seminars are compulsory during the pre-Ph.D course and after that progress of students is monitored by holding seminars at least once per

				semester.
6.	Research Facilities available in the Department	7		Adequate state-of-the-art research facilities are available in the department. Kindly see the list attached at A-I.
7.	Average No. of Research Students/Faculty	7		One student per faculty
8.	Average No. of Research Papers of Ph. D Students (Indexed Journals)	7	
9.	Average Duration to Complete Ph.D (years)	8		Based on last five year's data: Average Duration for full time students: 4.5 years(approx.) Average Duration for full time students: 6 years(approx.)
10.	Participation of Research Scholars in Conferences/Workshops	9		Kindly see the list attached at A-II.
	Total Score (out of 100)	73		

B. RESEARCH

		Score		
		Self-assessment	Expert assessment	
1.	Research Ambience in the Department	8		Well-equipped state-of-the-art research labs are available in the department.
2.	Research Awareness among Doctoral Students	8		Students present their work at national and international conferences and review literature in their area of research from time to time.
3.	Thrust areas of research in the department	7		Department offers research in thrust areas like: Nano materials, Nano technology, precision agriculture, nuclear spectroscopy, photonics and atomic spectroscopy
4.	Quality of Research	9		Research papers are published in good impact factor indexed journals.
5.	Collaborations with other departments (within the institute) and at National, and International levels.	9		Collaboration with different departments (Mechanical, Chemistry, Food etc.) with-in institute exists. At National Level collaborations with IUAC, Thapar inst. of Eng. and Tech., IIT Delhi, IIT Jodhpur exist. At international level collaboration with ZEUS experiment exists.
6.	Impact and Quality of Publications	9		Research papers are published in good impact factor indexed journals. Our Ph.D. students are well placed in various academic and research institutes.
7.	Relevance of Research to Knowledge Generation and Social Relevance	9		The students are well placed in various academic and research institutes. The ongoing research on the department is beneficial to society e.g. food, agriculture and biological systems.
8.	Student Exposure for Attending Quality Conferences/Symposia	9		From time to time students attend good quality conferences/workshops/training programmes etc.
9.	Inter-departmental collaborations	7		Collaboration with different departments (Mechanical, Chemistry, Food etc.) with-in institute exists.
10.	Industry/externally funded sponsored research (Numbers and amount)	5		Two research projects are submitted to DST and CSIR. (Amount no mentioned)
	Total Score (out of 100)	80		

General Comments on,

1. Plan of action of the department for the next five years (in view of NEP 2020)

Comments: Start of 5 year integrated BSc(Hons) + MSc Programme

2. Significant achievements of the department (faculty/Staff/Students)

Comments:

- Organized TEQIP-III (online mode) on 'Materials synthesis and characterization techniques' at NIT Uttarakhand, Srinagar Campus under twinning programme during 7-11 Sept 2020 under the coordinator-ship of Prof. M M Sinha
- Prof. M M Sinha has delivered invited talk to participant of TEQIP-III sponsored online STTP (online mode) on 10th Sept 2020.
- Organized self-financed short term course on 'Advanced functional materials (AFMAT-2020) (online mode) during Sept 28, 2020-Oct 02, 2020 under the chairmanship of Prof. M M Sinha and coordinator-ship of Dr P Kaur and Ms K Aggarwal
- Organized 5th National e-conference on advanced materials and radiation physics (AMRP-2020) during 9-11 Nov 2020 under the chairmanship of Prof. M M Sinha and coordinator-ship of Prof. S S Verma
- Organized TEQIP-III (online mode) on 'Recent advances in optical and magnetic materials' at NIT Uttarakhand, Srinagar campus under twinning programme durinf 14-18 Dec, 2020 under the chairmanship of Prof. M M Sinha

MSc students:

Pass –out batch	2019	2020	2021
Students Qualifiled NET/GATE/TET	5	2	2(25)
Placed/Higher Studies	9**(19)	6*(18)	--
%age	47.3%	33.3%	8%

Research Scholars:

SLIET Quality Publication Award (SQPA) has been received by Dr Jagdeep Singh, Dr Pradeep Bhatia, Ms Yuhit and Ms Tavneet Kaur

3. Placement record of the department (Last three years)

Comments: (No answer)

4. Scope for training of faculty/staff for further strengthening the teaching-learning process for strengthening the curriculum with the addition of new courses having relevance at National and International levels.

Comments:

Scope exists and during 2020-21 it is as follows: (Imcomplete)

5. Effective/Continuous monitoring of faculty/staff in delivery the course contents (at departmental level) for enhancing the teaching-learning process.

Comments:

From time to time, HOD (Physics) advises/instructs/monitors faculty/technical staff to enhance the teaching-learning process.

6. Technical Societies/ Colloquium for Students

- (i) Departmental Society:

Comments:

Physics Society for MSc students was established in 2018 and it is still in existence.

- (ii) Student Chapter(s) of Professional Societies

Comments: NIL

7. Scope of improvement in the presenting teaching – learning process

Comments:

1. by introducing adequate number of more regular faculty and also the technical staff in the department.
2. more rooms are required to accommodate the guest faculty and also the research scholars working in computational physics.
3. more space for MSc labs is desired.

4. smart class-rooms for UG and ICD are also required.

8. The skill and expertise of the faculty/Technical staff in the department (specific)

Comments:

SN	Faculty	expertise
1.	Dr K S Kahlon	Atomic Physics
2.	Dr A S Dhaliwal	Nuclear Physics and Materials Science
3.	Dr M M Sinha	Theoretical condensed matter Physics
4.	Dr S S Ghumman	Nuclear Physics and Materials Science
5.	Dr S S Verma	Theoretical Plasmonics Physics
6.	Dr K S Mann	Atomic Physics and Materials Science
7.	Dr P Kaur	High Energy Physics and Materials Science
8.	Ms K Aggarwal	Materials Science

9. Strengthening laboratory infrastructure (adding of new equipment's and use of present facility for optimum use)

Comments:

Every year from time to time new equipment are being added. Some major equipment procured during 2020-21 are as follows:
Hall Effect apparatus, x-band microwave Test bench (Klystron Tube), x-band microwave Gunn diode, Density meter, computer workstation.

10. Any other point

- To reduce the gap between offline and online teaching for ICD students a number of videos have been prepared by Prof. K S Kahlon & team for PH-111 and PH-121 experiments which have been found very useful by ICD students. The same are available at:
- <https://online.fliphtml5.com/gscha/rlyc>
- <https://online.fliphtml5.com/gscha/otnk/#p=1>
- To cope-up with the COVID-19 situation special week-end classes were scheduled to provide the hands-on experience in labs via offline classes for UG/20 first year students.
- E-lab manuals for computational Physics (M.Sc) have been prepared and are available at:
- <https://online.fliphtml5.com/gscha/nysc/>
- In addition to this proper reading material was provided to the students in addition to holding online classes via Google classroom/zoom etc.

C. Departmental Infrastructure

		Score		
		Self-assessment	Expert assessment	
1.	Adequacy of Class Rooms and Multi-Media Facility	6		Class-rooms are adequate whereas multimedia facility is available only to MSc students
2.	Availability of Laboratories	7		Laboratories are available to all ICD and UG programme but it is not adequate (in terms of space) to M.Sc. programme
3.	Availability of Conference/Seminar Room, etc	6		No independent conference/seminar room is available. For this purpose, generally rooms such as ISTE Hall / Computer auditorium/ Training placement hall are used.
4.	Availability of Seating Space for Faculty and Research Students	5		Seating space for guest faculty as well as research scholars working in theoretical physics is inadequate.
5.	Availability of Internet Services in Research Labs and Class Rooms	8		Available in research labs and in smart class rooms only (i.e. not available in all class rooms)
6.	Departmental Library and E-Resources	7		Department library is well equipped and is handled by one of the laboratory attendant of department of physics. E-resources are available as per provisions made by the central library.
7.	Computing Facilities and Software	7		Computational lab exists in the department for M.Sc. students. Various software like quantum espresso, FDTD are being used in the department for research purpose.
8.	Adequacy of Offices and Furnishing for Faculty	6		More rooms are required to accommodate the guest faculty in the department.
9.	Faculty- Student Ratio	5		As per the load allocated to department during 2020-21, the average Faculty-Student ratio is 1:61.
10.	Support Staff (Technical/Administrative) Adequacy	5		Inadequate number of technical staff in labs.

Total: 62

SWOT analysis by the department

Strengths:

- Well-equipped labs provide quality education to students.
- Students belonging to various states of India have got admission in M.Sc. programme.
- Faculty have published good number of research papers in various national and international referred journals.
- Research labs are equipped with state-of-the-art equipment such as Electrically cooled X-ray detector, Electrochemical work station, Electron gun, Vector Network Analyzer, X-ray and gamma-ray spectrometers.
- Licensed software such as FDTD, Fortran.
- National conferences organized by the department attract good number of researchers/ experts from all over the India.
- Work-station computing facility and presently it makes use of Quantum Espresso software.
- Many MSc (physics) pass-out students have got admission for higher studies in well-known institutes such as IITs
- Good number of books are available in departmental library.

Weaknesses:

- Inadequate number of regular faculty.
- More space for MSc labs is desired.
- Inadequate number of technical staff in labs.
- More rooms are required to accommodate the guest faculty and also the research scholars working in computational physics.

Opportunities:

- faculty as well as students can enhance their knowledge through available e-resources as well as from well-equipped laboratories.
- adequate research facilities in the fields of materials science, radiation and theoretical physics, are available.

Threats:

Suggestions for improvement:

- More regular faculty members are required so as work related with tutorials and labs can be handled effectively and moreover it will be very helpful to implement the UGC choice based system in MSc (physics) program as well as to float more optional elective subjects to UG students.
- Adequate number of technical staff is desired in labs for better functioning of labs for the students.
- To accommodate the guest faculty as well as research scholars especially working in theoretical physics more rooms are required and also more laboratory space is needed for MSc(Physics) course.
- Faculty members should be encouraged to submit research projects.
- Ways should be evolved to attract a good number of bright students for Ph.D as well as for M.Sc(Physics) program.
- The OBE based scheme needs a bit more improvement and understanding by the faculty.
- ICD load is required to be increased (4-1-2 instead of 4-0-2) to complete the syllabus with optimum tutorial classes.
- There shall be 20 students/teacher in labs in order to demonstrate the experiments effectively. So if more students are there number of teachers should be increased accordingly.
- For students opting for repeat there should be separate classes as there is always overlap between their actual class and repeat one.
- The structure of SET for Ph.D may be reviewed to enhance number of Ph.D admissions.

D. Outcomes

		Score		
		Self-assessment	Expert assessment	
1.	i. Placements for ICD ii. Placement of B. Tech iii. Placement of Masters Student iv. Placement of Ph. D Students	2.5 (5) 5 (5)		Placement Data for M.Sc. Students is provided at page number 8 (under General Comments on column) 100% of Ph.D Students are placed.
2.	Average No. of Ph. Ds Awarded per Year	7		1.8 (Based upon data of last 3 years)
3.	Publications per Faculty in Indexed Journals/Year (Average of last three years)	8		3
4.	Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus)	6		36

5.	Recognitions; Awards (National/International) to Faculty/Students	0		
6.	Consultancy and Externally Funded Projects	0		
7.	No. of Ph.D. graduates who took Academics as Career (Last 5 Years)	10		8 out of 8 (for last five years) took Academics as Career.
8.	Students offered for higher studies	7		18.9%% based on 2019, 2020 pass out batches.
9.	No. of qualified students NET/GATE/CAT etc (State/Central Civil Services)	6		18.9% based on 2019, 2020 pass out batches.
10.	Entrepreneurship	10		-----

Total: 61.5

Comments & Suggestions for Improvement:

- Faculty members should be encouraged to submit research projects.
- Mock test series for PG students may be started to increase their pass percentage in NET/GATE/CAT etc.
- Research scholars of the department will be encouraged to do quality research work and present the same effectively at various platforms in future too.

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY

ACADEMIC AUDIT (2020 - 2021)

SUMMARY SHEET

1.	Name of the Department	Physics	
2.	Name of Reviewer Designation & Address	From Academia	
		1. Dr. Ashwani Kumar, Prof. NIT Kurukshetra –External Expert 2. Dr. J.S. Dhillon, Coordinator IQAC cell & Dean Academics 3. Dr. H.R. Ghatak-Member(Prof) -Member 4. Dr. Mandeep Ghai-Member 5. Dr. K.S. Mann, Prof (Phy) & HOD Nominee 6. Dr. M.M. Sinha, HOD (Physics)- convener	
		From Industry	
		--	
3.	Date of Meeting	31-08-2021	

Score Summary							
Academic				Research (Max Score 100)	Departmental Infrastructure (Max Score 100)	Outcome (Max Score 100)	Total Score (700)
ICD Program (Max Score 100)	UG Program (Max Score 100)	PG Programs (Max Score 100) (Average of all PG programs)	Doctoral Program (Max Score 100)				
73	77	75	73	80	62	61.5	501.5

Note: 1. Marks mentioned above is the average of the marks given by the experts.
 2. If marks have not been allotted for some attributes by the experts, total score can be scaled to maximum marks.

Name & Signature of HOD