ACADEMIC AUDIT REPORT
(2023-2024)

DEPARTMENT OF PHYSICS

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY
(Deemed-To-Be-University, Under MoE, Govt. of India)
LONOGOWAL-148106

COMMITTEE MEMBER:

Dr. A.S. Dhaliwal, Prof.
Dr. K.S. Kahlon, Prof.
Dr. M.M. Sinha, Prof.
Dr. S.S. Verma, Prof.
Dr. Jagdeep Singh, AP (GF)

Dr. SS Verma | Dr. Indraj Singh | Dr. KS Kahlon | Dr.HR Ghatak | Dr. PK Dhiman | Dr. SK Tripathi (Online)

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY
(Deemed-To-Be-University)
LONOGOWAL-148106

ACADEMIC AUDIT (2023-2024)

PROFORMA OF ASSESSMENT

1. **Name of the Department: Physics**

2. **Reviewer (Name, Designation & Address):**

1. Dr. SS Verma, HOD Physics, SLIET Longowal
2. Dr. Indraj Singh, Associate Dean (ICD & UG), SLIET Longowal
3. Dr. KS Kahlon, Professor, SLIET Longowal
4. Dr.HR Ghatak, Professor (ChE), SLIET Longowal
5. Dr. PK Dhiman, Professor (M&H), SLIET Longowal
6. Dr. SK Tripathi, Professor and Chairman, Department of Physics, Panjab University, Chandigarh

3. **Date of Review: 11-11-2024 (Monday)**

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.

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A. ACADEMICS

A.1	ICD Programme	Score		Remarks
		Self-assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility), Theory/ practical (contents/ratio).	9 (10)	9	• The curriculum is developed through Board of Studies (BOS) meetings with external experts based on OBE (Objectives based Education). • BOS meetings were held in 2018, 2019, 2020, 2022, and 2023 and 2024. • Meeting minutes are available online: http://phy.sliet.ac.in/board-of-studies-bos/. • The curriculum focuses on building students' foundational understanding of Physics for technical education and standardizing knowledge. • It is regularly updated based on needs, with BOS meetings held in a year. • Student feedback, gathered via the ERP portal is considered to enhance teaching and learning. • Practical's for BSPH-103 and BSPH-104 are 100% aligned with the theory. • Program Outcomes (POs), Program Specific Outcomes (PSOs), and Course Outcomes (COs) for BSPH-103, (BSPH-106) and BSPH-104, (BSPH-107) (theory and practical) have been designed and will be finalized in the June 2024 BOS, adhering to NAAC guidelines. • The latest syllabus is available at: http://phy.sliet.ac.in/syllabus/.
2.	Equivalence and Relevance of curriculum at national level	9 (10)	9	• A comparison with the "Model Curriculum for Diploma Courses in Engineering & Technology 2019" by AICTE shows that the physics curriculum is almost identical and highly relevant at the national level.
3.	Formal Academic Load on Students [Teaching,	8 (10)	8	• The weekly academic load is: L = 2, T = 1, and P = 0 for both

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	Laboratory/Practical, Projects(minor/major)]			BSPH-103 and BSPH-104 Theory and L = 0, T = 0, and P = 2 for BSPH-106, Applied Physics-I Lab and BSPH-107, Applied Physics-II Lab. • ICD students engage with 30 additional hands-on science-engineering models beyond regular Physics practicals. • Further efforts could be made to introduce minor/major projects to enhance the understanding of the science-engineering connection.
4.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	9 (10)	9	• A continuous evaluation process is followed, including minors, majors, assignments, quizzes, and viva for both theory and practical components, in line with institute guidelines. • The examination process is fully transparent, allowing students access to all exam documents and the opportunity to discuss any concerns with their teachers.
5.	Tour/Training/Industrial visits/Internship opportunities provided during the year	5 (07)	5	• ICD students, from various engineering departments (*OICD Programme), take Physics courses BSPH-103 and BSPH-104 (Theory & Practical) during their 1st and 2nd semesters. • Tours, training, industrial visits, and internships are organized by their respective engineering departments. • The Department of Physics provides practical, hands-on training through modern audio/video methods, focused on laboratory experiments. • The curriculum includes skill-based education with hands-on training using instruments like Vernier calipers, screw gauges, spherometers, microscopes, physical balances, multimeters, and more. • ICD students are also exposed to 30 additional hands-on science-engineering models beyond regular Physics practicals. • Further efforts are needed to create more opportunities for tours, training, industrial visits, and internships specifically for these students.

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6.	Effectiveness of Assisted Learning, Tutorial System for ICD Students/ Seminars (Refer Course File)	02 (02)	2	• Assisted learning has been implemented but needs further strengthening. • Complete notes for theory of both semesters are provided to students through email and google classroom and available online: (Annexure-A1. I). • Practical manuals for BSPH-106 and BSPH-107 are available in Hindi, Punjabi, and English: (Annexure-A1. II). • Student feedback is collected via the ERP portal: ERP Portal to improve the teaching process. • Video demonstrations of practicals are used in class and accessible through Google Drive (Annexure-A1. II). • Class notes and practical materials are shared with students via email, with additional resources available in Google Drive (Annexure-A1. I and II). • More tutorials and smaller tutorial groups are needed. • Regular assignments are provided, with special quizzes and minors designed for weaker students. • Weaker students are encouraged to seek help from their teachers.
7.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	9(10)	9	• Faculty mentoring is available through various programs at the institute, such as the TGSMS: TGSMS Portal and Counselor support. • Mentorship programs include the Student Mentorship Scheme (SMS) and the Tutor-Guardian Scheme (TGS). • Class counseling is provided by dedicated class counselors for each group. • A weekly mentoring session is scheduled every Wednesday from 4:30 to 5:30 PM, allowing students to interact with teachers after classes or labs. • These initiatives aim to offer students valuable guidance and support.
8.	Practical activities, non-academic and totally related to a specific trade for skill development and *developing expertise in a particular group of techniques.*	9 (10)	9	• The Department of Physics provides hands-on training through modern audio/video teaching methods for laboratory experiments.

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				• The curriculum includes skill-based education, offering training with instruments such as Vernier calipers, screw gauges, spherometers, microscopes, physical balances, multimeters, and more. • ICD students also engage with 30 additional hands-on science-engineering models beyond regular Physics practicals. • The physics lab is essential for developing measurement skills, benefiting students across all engineering disciplines. • The department should work towards creating more skill and technique development opportunities in collaboration with engineering departments. • The three-language formula, as per NEP-2020, is implemented to enhance practical learning. Practical manuals for BSPH-106, 107 are available in Hindi, Punjabi, and English (Annexure-A1. I and II).
9.	Linkage of ICD programs to outcome based vocational education (Industry linkage)	9 (10)	9	During practicals, students are trained to use fundamental measuring instruments such as Vernier calipers, screw gauges, spherometers, microscopes, physical balances, multimeters, color codes, Ohm's law setups, and meter bridges. These skills are valuable for their development in various industrial contexts.
10.	Availability of workshop type lab/laboratory for providing hand on training to the students for skill development	9 (10)	9	Two well-equipped laboratories are available, both featuring multimedia and projector facilities to offer hands-on training and enhance students' skill development.
	Total Score (out of 100)	**78**	**78**	

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A.2	UG Programme	Score		Remarks
		Self-assessment	Expert assessment	
1.	Curriculum (Structure, Course syllabi, Flexibility, Choice based credit system)	10 (10)	10	• In the Bachelor of Engineering (B.E.) program, the department offers Physics (Theory) with course code BSPH-401 and a Physics laboratory (BSPH-402) experts based on OBE (Objectives based Education).: Courses. • These courses are designed to provide students with a foundational understanding of physics principles and practical laboratory experience to support their engineering studies. • The department also offers various elective subjects to align education with students' interests and career goals. Common elective subjects in B.E. include: ✓ Statistical Physics and Thermodynamics ✓ Basic Materials Science ✓ Plasma and Its Applications ✓ Radiation Biophysics ✓ Laser and Its Applications • However, elective courses have not been offered in recent years due to a faculty shortage. • The curriculum is developed through Board of Studies (BOS) meetings, involving external experts. Student feedback is collected via the ERP portal to improve teaching and learning. • The curriculum aims to enhance students' comprehension of physics concepts for technical education and standardization of knowledge. • The curriculum is open to modifications, with BOS meetings scheduled in a year. • Practical training for BSPH-402 is designed to have a 100% correlation with BSPH-401 theory. • POs, PSOs, and COs for BSPH-401 and BSPH-402 have been designed as per NAAC guidelines.

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2.	Status of study material developed by faculty for students	9 (10)	9	• The department's faculty is actively involved in developing and updating study materials for both the theory and practical components of the courses. • Theory notes and practical manuals for BSPH-401 and BSPH-402 are available in the public domain via Google Drive: (Annexure-A2. I). • For the practical course BSPH-402, faculty have created various presentations and lectures to help students understand the physics principles underlying the experiments. • This commitment to high-quality educational resources enhances the learning experience for students. • Multimedia resources and demonstrations are utilized in the laboratory.
3.	Relevance of contents of courses taught to the students and scope of improvement (revision of syllabus, addition of new experiments)	8 (10)	8	• Course contents are designed following AICTE guidelines and the Board of Studies (BOS). • The department's Academic Affairs Committee (DAAC) and BOS have revised the course contents based on regular feedback from students, teachers, and alumni in 2018, 2019, and 2021. • Student feedback is collected through the ERP portal (link) to enhance teaching and learning. • Students Satisfaction Survey results can be found in: Annexure-A2. II. • The syllabus feedback and action taken report are available in Annexure-A2. III. • Annual student feedback is also collected through ERP (link). • New experiments are regularly added to meet course requirements and enhance students' understanding of Physics concepts in relation to technical education and knowledge standardization.
4.	Formal academic load on students [Teaching, Laboratory/Practical, Projects(minor/major)]	9 (10)	9	• The formal academic load per week for BSPH-401/402 courses is: L= 3, T= 1, P= 2. • UG students are from various engineering departments (*OUG Programme). • Some trades take Physics courses BSPH-401 (Theory) in the 1st

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				semester and others in the 2nd semester. • Students are introduced to an additional 30 sets of hands-on science-engineering models beyond regular Physics practicals. • More efforts can be made to provide minor/major projects in collaboration with engineering departments to enhance their understanding of the science-engineering connection.
5.	Modern teaching methods in practice other than the conventional methods E-Assisted Learning (i) Availability of Library Resources (ii) Multi-Media Assisted Teaching	9 (10)	9	• The Department of Physics is at the forefront of modern teaching methodologies, moving beyond conventional approaches to provide students with a dynamic learning experience. • E-Assisted Learning is a cornerstone of this educational approach, offering a wealth of digital resources and online tools that enrich the learning journey. • Students benefit from a well-equipped laboratory and Multi-Media Assisted Teaching, which is integral to the pedagogical approach, ensuring complex physics concepts are effectively understood, visualized, and applied. • Video displays of practicals are utilized in class and are also available on public platforms (Annexure-A2. IV). • Class notes and practical manuals are shared with each student via email, and related materials are accessible through a Google Drive link. • The department is working on creating virtual labs to enhance e-assisted learning for practicals. • The institute library houses a vast resource of e-books for the benefit of students. • Through these innovative methods, the Department of Physics is dedicated to fostering a deeper understanding of the subject and preparing students for the challenges of today's rapidly evolving technological landscape.
6.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation) (i) Theory and tutorial (ii) Practical (case studies)	10 (10)	10	• The Department of Physics employs a comprehensive evaluation process (as per institute guidelines) to assess students' progress in both the theory and practical aspects of the curriculum. • For theory and tutorial components, Continuous Evaluation methods are implemented to measure students' understanding

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				and performance throughout the course. This includes minor assessments, assignments, quizzes, major exams, and tutorial sessions, ensuring a continuous and thorough grasp of the subject matter. • The examination process is transparent, allowing students access to all examination documents and the opportunity to discuss their concerns with teachers. • For practical assessments, the evaluation process extends to case studies where students are challenged to apply their knowledge in real-world scenarios. • This hands-on approach enables students to demonstrate their problem-solving skills and the practical application of physics principles. • Through this multifaceted evaluation process, the Department ensures that students not only acquire theoretical knowledge but also develop the ability to apply it practically, preparing them for success in both academic and real-world settings.
7.	Faculty–Student Interaction (Whether any slot is fixed for the students to interact with a teacher, after classes/labs	9 (10)	9	• Faculty mentoring is accessible through various avenues at the institute level, including the Tutor-Guardian Scheme (TGSMS) and designated counselors. • The Student Mentorship Scheme (SMS) provides additional support for students. • Each class has a designated class counselor who is available for guidance. • A dedicated period from 4:30 to 5:30 PM every Wednesday is included in the central timetable for students to interact with a teacher after classes and labs. • These initiatives are designed to provide students with valuable guidance and support, enhancing their academic experience and personal development.
8.	Tour/Training/Industrial visits/Internship opportunities	6 (10)	6	• The undergraduate (UG) students in the OUG Program primarily belong to other engineering departments and study Physics courses BSPH-401 (Theory) and BSPH-402 (Practical) during their 1st and 2nd semesters.

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				• Tours, training, industrial visits, and internship opportunities are organized by their respective engineering departments. • The Department of Physics provides practical, hands-on training related to laboratory experiments using modern audio and video teaching methods. • The curriculum includes skill-based education, incorporating hands-on training with various instruments such as lasers, interferometers, optical fibers, cathode ray oscilloscopes (CRO), photocells, dielectrics, and ferroelectric materials. • UG students are introduced to an additional 30 sets of hands-on science-engineering models beyond the regular Physics practicals. • The department aims to create more opportunities for tours, training, industrial visits, and internships in collaboration with engineering departments. • In alignment with the NEP-2020, the three-language formula is being implemented to impart practical knowledge, with plans to prepare practical manuals in Hindi, Punjabi, and English for the course.
9.	(a) Effectiveness of Assisted Learning in Tutorial classes/seminars for Students	9 (10)	9	• The assisted learning process is well-established and requires further strengthening. • Video displays of practical sessions are utilized in class and are accessible on public platforms. (See LINK in Annexure-A2. IV) • Class notes and practical notes are shared with each student via email. • Additional related materials are available through a Google Drive link. (Annexure-A2. I) • There is a need for more tutorials, with a limited number of students in each session to enhance learning. • Regular assignments are provided to students to reinforce their understanding. • Special quizzes and minor assessments are offered to support weaker students. • Weaker students are encouraged to seek help from their
	(b) Faculty Mentoring/Faculty Advisor System for Students/Class of Students			

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				respective teachers. • A designated period from 4:30 to 5:30 PM every Wednesday is included in the central timetable for students to interact with teachers after classes and labs.
10	Placement %age/higher studies options (last three years)	---	---	This activity is not related to Physics department as it is a *OUG Programme.
Total Score (out of 100)		**79**	**79**	

Suggestion from Reviewers:

- First practical is given to every student in the form of Project (Small Project).
- Practical application of Physics laws should be introduced in practical/theory class.
- Course curriculum should be branch (respective engineering department) specific.

A.3	PG Programme (Separate for each programme)	Score		Remarks
		Self-assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility)	8 (10)	8	• The course syllabi and content for the M.Sc. (Physics) program closely adhere to the guidelines set by the University Grants Commission (UGC) based on OBE. • Implementing a choice-based system has presented challenges due to a limited number of faculty members. • Despite this, the department is committed to providing high-quality education that aligns with UGC standards and continually seeks opportunities for improvement within its capacity. • The curriculum is developed through Board of Studies (BOS) meetings, which include external experts. The most recent BOS meetings were held in 2018, 2019, and 2021. Minutes from these meetings are available in the public domain at: [Board of Studies Minutes] (http://phy.sliet.ac.in/board-of-studies-bos/). • The course curriculum aims to enhance students' comprehension of physics, its latest developments, and the standardization of their knowledge and learning. • The curriculum is open to modification as needed, with BOS

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				meetings scheduled in a year. • Student feedback is collected through the ERP portal ([Feedback Portal] (http://14.139.242.71:8081/SaralInfoSolutions.aspx?619e22d5-8c4e-440d-8f53-1c004188ef3c)) to improve the teaching and learning process. • A Student Satisfaction Survey is conducted, with results in Annexure-A3. I. • A syllabus feedback and action taken report can be found in Annexure-A3. II. • Annual student feedback is also collected through the ERP portal ([Annual Feedback] (http://14.139.242.71:8081/SaralInfoSolutions.aspx?00849c48-fc1c-4767-be95-3197f2e6ee86)). • The curriculum includes sixteen theory courses and eight laboratory courses, providing students with additional opportunities to learn both advanced and basic concepts of physics through hands-on experience. • Students are offered project work in their final semester, emphasizing experiential learning. • Program Outcomes (POs), Program Specific Outcomes (PSOs), and Course Outcomes (COs) for all theory and practical courses are designed and will be further modified in the forthcoming BOS scheduled for November 2024, in accordance with NAAC guidelines. • Old course contents are available in the public domain at: [Old Course Contents] (http://phy.sliet.ac.in/syllabus/). • The modified and updated course contents from the upcoming BOS will also be uploaded on the departmental webpage: [Departmental Syllabus] (http://phy.sliet.ac.in/syllabus/).
2.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	10 (10)	10	• The weekly academic load for students is structured as follows: **Lectures (L)** = 4 courses × 4 hours = 16 hours, **Tutorials (T)** = 4 courses × 1 hour = 4 hours, and **Practicals (P)** = 8 hours.

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				• In the final semester (4th), some students are offered project work based on merit as well as by choice. • This structure aligns with the guidelines set by the institute.
3.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	10 (10)	10	• In the M.Sc. Physics program, we implement a rigorous evaluation process that includes both Continuing Evaluation and End-Term Evaluation methods to effectively assess students' academic progress. • **Continuing Evaluation**: involves ongoing assessments, such as assignments, quizzes, and periodic examinations throughout the program's duration. This continuous feedback mechanism ensures that students remain engaged with the subject matter and solidify their understanding of the coursework as they advance. • **End-Term Evaluation:** serves as the culmination of students' efforts, featuring comprehensive examinations that assess their mastery of the subject matter. This final assessment is designed to gauge the depth of their knowledge and their ability to apply it effectively. • The evaluation process is structured to provide students with a well-rounded and in-depth understanding of physics, ensuring they are academically prepared and equipped with the necessary problem-solving skills for success in the field. • The entire examination process is conducted transparently, allowing students access to all examination documents and the opportunity to discuss any concerns with their teachers.
4.	Relevance of contents of courses taught to the students and scope of improvement	8 (10)	8	• The course contents are designed following AICTE guidelines and the recommendations of the Board of Studies (BOS). • Based on regular feedback from students, faculty, and alumni, the Department Academic Affairs Committee (DAAC) and BOS have revised the course contents periodically in 2018, 2019, and 2021. • Student feedback is collected through the **ERP portal** to enhance the teaching and learning process, accessible here: [ERP Feedback Portal](http://14.139.242.71:8081/SaralInfoSolutions.aspx?619e22d5-8c4e-440d-8f53-1c004188ef3c). • The Students Feedback Reports documented as Annexure-A3. I,

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				and the syllabus feedback and action taken report is included as Annexure-A3. II. • New experiments are regularly integrated into the curriculum to address the needs of course content and enhance students' comprehension of physics concepts, supporting technical education and standardization of knowledge and learning. • The curriculum is open to modifications based on evolving educational needs, with BOS meetings scheduled in a year to facilitate updates. • The next BOS meeting is scheduled for the November month to review the curriculum with contributions from faculty, industry experts, and alumni. • Emphasis is placed on collaboration with industry experts and researchers, with regular interactions arranged for PG students through guest lectures and workshops from professionals in the field.
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	9 (10)	9	• PG classes (theory) are conducted in smart classrooms, where instructors utilize the latest advancements in e-assisted learning, incorporating tools such as PPTs, Google Classroom, virtual labs, and NPTEL-Swayam lectures. • The department has developed e-notes for all practical's, which have been uploaded on the department webpage and made available on multimedia platforms in the laboratory for student access. • The institute library has subscribed to all major search engines, including Scopus and Web of Science, providing faculty and students with access to extensive academic resources. • Additionally, the library has subscriptions to online e-books, which can be easily accessed by both students and faculty • The library also provides access to various online class systems such as MOOC and NPTEL allowing both teachers and students to benefit from a wealth of online educational resources.
6.	Technical Societies/ Colloquium for Students i. Departmental Society	8 (10)	8	• The department provides a platform for students to engage in both academic and extracurricular activities, fostering a sense of

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	ii. Student Chapter(s) of Professional Societies			community and promoting academic growth. • The Iota Physics Society was established in 2018 and continues to operate, offering students opportunities for collaboration, networking, and participation in various physics-related events and activities. For more information, you can visit their official page.
7.	Tour/Training/Industrial visits/Internship opportunities	9 (10)	9	• Students are consistently encouraged to participate in tours, training, industrial visits, and internships, which the department arranges regularly. • Recent educational and technical trips have included visits to prestigious institutes such as IIT Ropar, IIT Delhi, GNDU Amritsar, and IISER Mohali. • Students have secured internships at various reputed institutes, providing them with valuable practical experience. • More information about these activities can be found on the department's official page: (http://phy.sliet.ac.in/departmental-activities/)
8.	Collaboration with other departments (within institute)	8 (10)	8	Department do have two-way collaboration with various departments within the institute like Chemistry, Food Engg, Mechanical Engg., Math's, Electrical & Instrumentation, Electronics and Communication, Computer Sci. & Engg. and Chemical Technology.
9.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	10 (10)	10	**Mentorship and Counseling:** ✓ Each PG class has a dedicated class counselor. ✓ Faculty members are readily available as mentors to provide guidance. ✓ Senior students serve as mentors for junior peers. **Project Supervision:** ✓ A project supervisor is assigned to each PG student in their 4th semester for project work. **Head of Department Guidance:** ✓ The HoD is always accessible to PG students for additional guidance and support.
10.	Monitoring and continuous evaluation of the project work assigned to the students (mechanism)	10 (10)	10	**Assignment and Supervision:** ✓ Project work is assigned at the beginning of the 3rd semester based on merit up to the 2nd semester, with a ratio of 1 teacher to 1 student.

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				✓ Additional interested students are accommodated in project work. **Regular Interaction:** ✓ Students are encouraged to meet their supervisors regularly for guidance. **Monitoring and Presentations:** ✓ Monitoring of project work begins at the start of the 4th semester. ✓ Students present their topic selection and methodology after one month. ✓ Progress presentations occur after 2-3 months. ✓ A final presentation is required before submitting the project report. **Evaluation:** ✓ Final viva-voce is conducted by an external expert at the semester's end. ✓ Evaluation consists of 50% from internal/supervisor assessment and 50% from the external examiner. **Publication Encouragement:** ✓ Students are encouraged to publish their project findings in journals. **Documentation:** ✓ All relevant documents are attached as (Annexure-A3. III).
	Total Score (out of 100)	**90**	**90**	

Suggestion from Reviewers:

- New courses (industry based) should be added in the revised curriculum.
- Project should be given to maximum students.
- Project work should be full semester and allow to work outside the institute and in the field of applied sciences and Engineering.

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A.4	Doctoral (Ph.D.) Programmes	Score		Remarks
		Self-assessment	Expert assessment	
1.	Intake of Ph.D. Students	05 (10)	5	Few students were admitted during 2023-24.
2.	Admission Process	10 (10)	10	**Ph.D. Admission Process** **Eligibility and Entrance:** ✓ Students seeking admission must qualify through SET/NET/GATE examinations. **Interview Process:** ✓ Qualified candidates undergo an interview conducted at the departmental level. **Merit-based Selection:** ✓ Admission is granted based on the overall merit, which includes performance in the entrance examination and the interview.
3.	Pre-Ph.D. Courses and Evaluation Process	10 (10)	10	**Course Structure:** The Pre-Ph.D. program includes three mandatory subjects: ✓ Research Methodology ✓ Research-related Subject (specific to the research area) ✓ Research Ethics **Seminars:** ✓ Two research-related seminars are conducted during the 1st year of the program. **Evaluation:** ✓ Continuous evaluation is carried out through the Research Advisory Committee (RAC) and Departmental Research Committee (DRC). **Regulations:** ✓ The program and its evaluation process comply with UGC norms and institute rules.
4.	Breadth and Depth of Knowledge of Students	9 (10)	9	**Entrance Test and Interview:** ✓ To assess the breadth and depth of the student's knowledge, an entrance test/interview is conducted before admission.

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				Continuous Evaluation: ✓ After admission, students undergo a continuous evaluation process through Research Advisory Committee (RAC) and Departmental Research Committee (DRC) as per UGC norms and institute rules. **Research Publication Requirement:** ✓ A minimum criterion of research publication is in effect, ensuring that students contribute to academic research during their course of study.
5.	Seminar/ Presentations and Technical Communication	10 (10)	10	**Ph.D. Admission, Evaluation, and Monitoring Process:** **Entrance Test and Interview:** ✓ To evaluate the breadth and depth of the student's knowledge, an entrance test/interview is conducted prior to admission. **Pre-Ph.D. Seminar Requirement:** ✓ Two seminars are mandatory during the pre-Ph.D. phase to ensure students' early engagement in their research topics. **Synopsis Submission & Evaluation:** ✓ Ph.D. candidates must submit and have their synopsis evaluated through the Departmental Research Committee (DRC) and an external expert within one and a half years of joining. This is a critical step before the final confirmation of registration. **Minimum Research Publication Requirement:** ✓ A minimum criterion of research publication is required for all Ph.D. students to ensure that they contribute to scholarly research. **Continuous Monitoring:** ✓ The progress of research students is monitored through seminars, with at least one seminar per semester to track advancements and provide feedback. **Compliance with UGC Norms:** ✓ All processes, including admissions, evaluations,

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				seminars, and publications, comply with UGC norms and institute regulations.
6.	Research Facilities available in the Department	8(10)	8	The department is equipped with adequate laboratory and research facilities to support the academic and research needs of students and faculty. For detailed information, please refer to the list of facilities provided in the following attachments: • (Annexure-A4. I) • (Annexure-A4. II)
7.	Average No. of Research Students/Faculty	0	0	One student per eligible faculty
8.	Average No. of Research Papers of Ph. D. Students (Indexed Journals)	8 (10)	8	On average, 4-5 research papers are published by Ph.D. students during their course of study. The list of publications from the last three years (2022, 2023 and 2024) is available and has been attached as (Annexure-A4.III), which has been uploaded to Google Drive for reference.
9.	Average Duration to Complete Ph.D. (years)	8 (10)	8	Based on data from the past five years, the average duration for full-time/part-time Ph.D. students to complete their degrees is approximately 4-5 years.
10.	Participation of Research Scholars in Conferences/Workshops	8 (10)	8	Kindly see the list attached at (Annexure-A4. IV) for further details. Additionally, this information for the academic year 2023-24 is uploaded and available in the public domain: http://phy.sliet.ac.in/departmental-activities/.
	Total Score (out of 100)	**76**	**76**	

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B. RESEARCH

B.1	Research and Industrial collaboration	Score		Remarks
		Self-assessment	Expert assessment	
1.	Research Ambience in the Department	9 (10)	9	The department has well-equipped research labs available for use. Kindly refer to the list attached at (Annexure-B.I). This information is also uploaded and available in the public domain at: http://phy.sliet.ac.in/laboratories/.
2.	Research Awareness among Doctoral Students	9 (10)	9	• Students regularly present their work at both national and international conferences and continuously review literature in their respective research areas. • For details on the recent participation of research scholars in conferences/workshops, kindly refer to the list attached at (Annexure-A4. IV). • This information for 2023-24 is also uploaded and available in the public domain at: http://phy.sliet.ac.in/departmental-activities/.
3.	Thrust areas of research in the department	9 (10)	9	**Research Thrust Areas of the Department** **Experimental Physics** ✓ Material Science/Condensed Matter Physics ✓ Nanoscience & Nanotechnology ✓ Radiation and Nuclear Physics/High Energy Physics **Theoretical Physics** ✓ Material Science ✓ Condensed Matter Physics ✓ Plasmonics This information is available in the public domain at the following links: Faculty and Staff, Research
4.	Quality of Research	9 (10)	9	Research Publications: ✓ Research papers are published in reputable journals with an Impact Factor (IF) greater than 2. ✓ For a comprehensive list of these publications, please refer to Annexure-A4.III.

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				This information is also available in the public domain at the following links: Faculty and Staff, Recent Publications
5.	Collaborations with other departments (within the institute) and at National, and International levels.	8 (10)	8	**Collaborations:** **Intra-Institutional Collaborations:** The department maintains collaboration with various departments within the institute. **National Collaborations:** The department collaborates with several national institutions, including: ✓ Inter-University Accelerator Centre (IUAC) ✓ Thapar Institute of Engineering and Technology ✓ Indian Institute of Technology (IIT) Delhi ✓ Indian Institute of Technology (IIT) Jodhpur **International Collaborations:** The department is also engaged in international collaboration with the ZEUS experiment.
6.	Impact and Quality of Publications	9 (10)	9	**Research Output and Impact** **Publication Quality:** Research papers are published in journals with a good impact factor (>2), ensuring high visibility and credibility in the academic community. A list of these publications is available in Annexure-A4.III. **Citation Metrics:** The citation index, h-index, and i10 index of research papers published by faculty and research scholars indicate strong academic impact. These metrics can be verified through various academic search engines such as Google Scholar, Scopus, Web of Science, ResearchGate, and Vidwan. **Career Placement:** Our Ph.D. students have been successfully placed in various esteemed academic and research institutions, demonstrating the program's effectiveness in preparing graduates for future careers in research and education.
7.	Relevance of Research to Knowledge Generation and Social Relevance	8 (10)	8	**Research Relevance and Impact** **Graduate Placement:** Our Ph.D. students have achieved commendable placements in various reputable academic and research institutes, reflecting the strength of our program and the preparedness of our graduates. **Societal Benefits:** The ongoing research within the department

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				addresses significant societal challenges, particularly in the areas of food security, agriculture, and biological systems. This research not only contributes to scientific knowledge but also has practical implications for enhancing quality of life. **Research Metrics:** The citation index, h-index, and i10 index of research papers published by our faculty and research scholars are impressive. These metrics demonstrate the impact and relevance of our research, and they can be verified through publicly accessible academic search engines like Google Scholar, Scopus, Web of Science, ResearchGate, and Vidwan. **Innovative Research Focus:** Faculty research is aligned with cutting-edge trends in science and technology. Topics include: ✓ Nanoparticles and their applications ✓ Radiation effects and nuclear waste recovery ✓ Plasmonics and plasmonic solar cells ✓ Thermoelectric properties of materials ✓ High-energy physics ✓ Dielectric properties of soil ✓ Biomaterials This research is essential in addressing emerging needs and highlights the social relevance of our work. For further details, please refer to the list attached in Annexure-A3.III.
8.	Student Exposure for Attending Quality Conferences/Symposia	8 (10)	8	**Student Engagement in Conferences and Workshops** **Active Participation:** Students regularly attend high-quality conferences, workshops, and training programs to enhance their academic and professional skills. This exposure helps them stay updated with the latest advancements in their field and encourages networking with experts. **Documentation:** A comprehensive list of the conferences, workshops, and training programs attended by students is available in Annexure-A4. IV. **Public Access:** Detailed information regarding departmental activities for the year 2023-24, including students' participation in these events, can be found on our public domain at

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				[Departmental Activities] (http://phy.sliet.ac.in/departmental-activities/).
9.	Inter departmental collaborations	8 (10)	8	**Student Collaboration:** Students actively collaborate with various departments within the institute, including Mechanical Engineering, Chemistry, Food Technology, Chemical Engineering, Computer Science and Technology, Electrical and Instrumentation, and Electronics and Communication. This interdisciplinary approach enhances their learning experience and fosters innovation. **Ph.D. Collaboration:** Currently, there is a collaborative Ph.D. project underway between the Department of Physics and the Electronics and Communication Department, showcasing the integration of knowledge and expertise across disciplines.
10.	Industry/externally funded sponsored research (Numbers and amount)	0 (10)	0	**Research Funding and Projects** **Previous Sponsorships:** The department has successfully secured sponsorship for projects from various funding agencies, including AICTE, CSIR, and MHRD. Details of these projects can be found on the public platform at Department Projects. **Current Funding Status:** As of now, there are no active industry or externally funded research projects within the department. **FIST Project Submission:** A FIST project proposal was submitted in 2024 and is currently under processing. More information can be found at the DST Online Submission Portal.
	Total Score (out of 100)	**77**	**77**	

Suggestion from Reviewers:

- Faculty should be appointed in the department with specific area of research of the department so that existing research facilities must be utilized.
- Retired faculty members should be allowed to continue their research association with the department.
- Process of recruitment should be fast so that department work smoothly.

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General Comments on:

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

Plan of Action for the Department of Physics (2024-2029)

Vision and Objectives

The Department of Physics at SLIET Longowal aims to enhance the quality of education, foster research excellence, and promote interdisciplinary collaboration in alignment with the National Education Policy (NEP) 2020. Our vision is to cultivate a dynamic learning environment that encourages innovation, critical thinking, and holistic development of students.

Key Focus Areas

Curriculum Development and Innovation

Revise and update the curriculum periodically based on feedback from students, faculty, and industry experts to ensure relevance and alignment with emerging trends in physics and technology.

Integrate interdisciplinary courses that blend physics with other fields, such as material science, nanotechnology, and computational science.

Incorporate experiential learning opportunities, including lab work, field studies, and projects.

Research and Development

- Establish research thrust areas focusing on experimental physics, material science, nanotechnology, and renewable energy.
- Encourage faculty and students to pursue high-impact research projects and publications in reputed journals.
- Facilitate collaboration with national and international research institutions and industry partners for joint research initiatives.
- Seek funding from government and private sectors for research projects.

Infrastructure Enhancement

- Upgrade laboratory facilities to include advanced equipment and technology for both teaching and research purposes.
- Develop smart classrooms equipped with modern teaching aids, including virtual labs, online resources, and e-learning tools.
- Create dedicated research spaces for students and faculty to foster innovation and collaboration.
- Skill Development and Capacity Building
- Implement skill development programs that focus on critical thinking, problem-solving, and research methodologies.
- Organize workshops, seminars, and guest lectures featuring experts from academia and industry.
- Encourage students to participate in internships, training programs, and industrial visits to gain practical exposure.

Student Engagement and Support

- Foster a supportive academic environment through mentorship programs, where faculty and senior students guide juniors in academic and personal development.
- Promote student-led initiatives and activities, such as science clubs, seminars, and community outreach programs.
- Regularly collect and analyze student feedback to improve teaching methods and address student needs.

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Collaboration and Networking

- Strengthen collaboration with other departments within the institute, encouraging interdisciplinary projects and research.
- Engage with alumni to enhance the department's network and opportunities for students.
- Participate in national and international conferences to showcase research and foster collaborations.

Quality Assurance and Accreditation

- Ensure compliance with the standards set by accreditation bodies and regulatory agencies.
- Implement a continuous evaluation process for faculty performance, teaching quality, and student outcomes.
- Pursue accreditation for new programs to enhance the department's reputation and attract students.

Implementation Timeline

- **Year 1 (2024-2025):** Conduct a comprehensive review of the current curriculum, establish research thrust areas, and upgrade laboratory facilities.
- **Year 2 (2025-2026):** Launch new interdisciplinary courses, enhance skill development programs, and strengthen industry collaborations.
- **Year 3 (2026-2027):** Host national and international conferences, implement mentorship programs, and evaluate research progress.
- **Year 4 (2027-2028):** Focus on quality assurance, prepare for accreditation processes, and assess the impact of implemented initiatives.
- **Year 5 (2028-2029):** Review and revise the plan based on outcomes and feedback, aiming for continuous improvement and sustainability.

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

- Mr. Nikhil Kumar, M.Sc. (Physics) final year student has been selected as a researcher for the purpose of carrying out a research project at Friedrich-Schiller-Universitat Jena (Germany) for a period 01.07.2024 to 30.06.2027 with a monthly gross pay of Euro 2831.14.
- Arunaava Ghosh, with registration number 2150365, has commenced his Ph.D. studies at the Institute for Plasma Research (IPR).
- Paritosh Shukla, holding registration number 2263003, has joined the Ph.D. program at the Indian Institute of Technology (Indian School of Mines), Dhanbad.
- Mr. Kailash (Ph.D. Student in Physics Department) with registration no. PPH-2131 has received the prestigious Raman-Charpak Fellowship-2023 funded by Department of Science and Technology, Government of India, Service for Science and Technology (SST), French Embassy in India / Ambassade de France en Inde and Ministry of Foreign Affairs & International Development, Govt. of France.
- Mr.Somendra, PGPHY-2363011, has been selected for summer internship-2024 at TIET, Patiala (Punjab)
- Mr. Anmol Singh, PGPHY-2363004, has been selected for Summer Internship-2024 at Indira Gandhi Centre for Atomic Research (IGCAR), Department of Atomic Energy, Kalpakkam -603 102, Tamil Nadu.
- Mr. Vijay Kumar, PGPHY-2363005, has been selected for summer internship-2024 at IIT Jodhpur (Rajasthan).
- Mr. Shahidul Islam, PGPHY-2363012, has been selected for summer internship-2024 at IIT Bhilai (Chhattisgarh)
- Ms. Harini S. Rao, PHPHY-2150360 has been selected to pursue Ph.D. at Department of Chemical and Materials Engineering Chang Gung University, Taiwan in the academic session 2024-2025.

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- Ms. Suman Somani, PGPHY-2363001, has been selected for summer internship-2024 at IIT Mandi.
- Ms. Punyasha Nayak, PGPHY-2363008, has secured summer internship-2024 under the supervision of Dr. Ritu Gupta, Assistant Professor, Department of Physics at IIT Ropar.
- Mr. Omveer Singh, PGPHY-2363013, has been selected for Summer Internship-2024 at Regional Centre Dr. K.S. Krishnan Geomagnetic Research Laboratory (KSKGRL) Prayagraj (U.P.) of Indian Institute of Geomagnetism (IIG), Bombay.
- Mr. Bhavnesh, PGPHY-2363010, has secured summer internship-2024 under the supervision of Prof. Vivek Malik, Department of Physics, IIT Roorkee.
- Department of Physics has been organized the 6th National Conference on "Advanced Materials and Radiation Physics (AMRP-2023)" from May 18-19, 2023 through Hybrid Mode, and accepted conference papers will be published in IOP Journal of Physics: Conference Series. For details, visit www.amrp2023.in.
- One-week Faculty Development Program (FDP) on "Characterization of Nano-Materials and Applications" (National Level) (Physical Mode) (22-26 May 2023) has been organized by; the Department of Physics, SLIET Longowal in collaboration with NITTTR Chandigarh at Sant Longowal Institute of Engg. & Technology, Longowal.
- "The Departments of Physics, Mechanical Engineering and Electronics & Communication Engineering of Sant Longowal Institute of Engineering and Technology, Longowal in collaboration with I.I.T. Jammu, NIT Delhi and Institute for Auto Parts and Hand Tools Technology (IAHT) Ludhiana have organized two day (15-16 March 2024) National Conference on "Advanced and Emerging Materials for Technological Applications" (AEMTA-2024) in Hybrid mode under the chairmanship of Dr. M M Sinha, Professor, Department of Physics, SLIET, Longowal".

3. Placement record of the department (Last three years)
The Placement data of students are available in the Annexure-D. I.

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.

To enhance curriculum and incorporate relevant new courses effectively, the following strategies will be implemented:

Regular Training Programs:
- ✓ Conduct periodic workshops focusing on pedagogical teaching-learning methodologies.
- ✓ Emphasize innovations in teaching practices and the integration of technology in the classroom.
- ✓ Ensure faculty members stay updated with industry trends through continuous professional development.

Curriculum Design Workshops:
- ✓ Organize workshops specifically aimed at curriculum design to align with emerging trends in physics and interdisciplinary fields.
- ✓ Engage faculty in collaborative discussions to share insights on curricular advancements and relevant industry requirements.

Encouragement for International Collaboration:
- ✓ Motivate faculty to establish international collaborations to incorporate global best practices into the curriculum.

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- ✓ Facilitate participation in international conferences to expose faculty to diverse educational methodologies and innovations.

Advanced Knowledge Training for Staff:

- ✓ Provide training opportunities for staff to develop advanced-level expertise in their respective domains, enhancing their ability to support the academic mission of the department.

Promotion of Advanced Degrees and Research:

- ✓ Encourage faculty to pursue advanced degrees and engage in research activities, fostering a culture of academic excellence and expertise.

Board of Studies (BOS) and Workshops:

- ✓ Organize regular BOS meetings and workshops to equip faculty with the skills necessary to strengthen the teaching-learning process.
- ✓ Focus on curriculum design and the introduction of new courses that meet national and international relevance.

Collaboration Among Educators:

- ✓ Promote collaboration among educators to explore and implement innovative teaching methods.
- ✓ Create a platform for sharing best practices and successful teaching strategies across departments.

Feedback System Enhancement:

- ✓ Upgrade the feedback system for faculty and students to ensure continuous improvement in the teaching-learning process.
- ✓ Implement a structured approach to gather insights on curriculum effectiveness and areas for enhancement, allowing for responsive adjustments.

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

To enhance the teaching-learning process within the Department of Physics, the Academic Monitoring Committee (AMC) and the Head of Department (HoD) will implement the following strategies:

Regular Meetings and Reviews:

- ✓ Schedule regular meetings between the AMC and faculty members to review teaching methodologies, curriculum delivery, and student engagement.
- ✓ Provide a platform for faculty to discuss challenges and share best practices in their teaching.

Feedback Mechanisms:

- ✓ Establish a structured feedback system that encourages students to provide insights on course effectiveness and teaching styles.
- ✓ Use feedback data to identify areas for improvement and to recognize exemplary teaching practices.

Monitoring Teaching Outcomes:

- ✓ Set clear performance indicators for teaching outcomes, including student performance, engagement levels, and course completion rates.
- ✓ Conduct periodic assessments of teaching effectiveness based on these indicators.

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Professional Development Opportunities:

- ✓ Encourage faculty to participate in professional development workshops focused on innovative teaching strategies, assessment techniques, and technology integration.
- ✓ Facilitate access to online courses and certifications that enhance pedagogical skills.

Curriculum Enhancement Initiatives:

- ✓ Provide guidelines and support for faculty to continuously update and enhance their course materials in line with current trends in physics and interdisciplinary fields.
- ✓ Promote the integration of research findings and contemporary practices into the curriculum.

Mentorship and Support:

- ✓ Foster a mentorship system where experienced faculty guide newer faculty members in effective teaching practices and curriculum design.
- ✓ Offer resources and support for faculty to experiment with new teaching methods in their classrooms.

Collaborative Teaching Projects:

Encourage faculty to collaborate on interdisciplinary teaching projects that promote innovative learning experiences for students.

Documentation and Reporting:

- ✓ Require faculty to maintain records of their teaching strategies, student feedback, and professional development activities.

The AMC will compile reports on faculty performance and development needs, ensuring that the HoD is informed and can provide targeted support.

6. Technical Societies/ Colloquium for Students
   (i) Departmental Society
   (ii) Student Chapter(s) of Professional Societies

Departmental Society: Iota Physics Society

Overview:

The Iota Physics Society was established in 2018 as a platform for Master of Science (M.Sc.) students within the Department of Physics. It serves as a vibrant community that fosters academic engagement, collaborative learning, and personal development among students.

Significance:

- ✓ **Community Building:** The society creates a sense of belonging among M.Sc. students, encouraging them to connect, collaborate, and share knowledge.
- ✓ **Academic and Extracurricular Activities:** The society organizes various events, including seminars, workshops, guest lectures, and informal gatherings, which enhance the academic experience and promote a well-rounded education.
- ✓ **Skill Development:** Through participation in society activities, students develop leadership, communication, and organizational skills, essential for their professional growth.

Future Directions:

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- ✓ **Expansion of Activities:** The society can introduce more diverse activities such as science fest, research presentations, and field trips to enhance practical learning experiences.
- ✓ **Collaboration with Other Departments:** Collaborating with other departmental societies or clubs can foster interdisciplinary learning and innovation.
- ✓ **Alumni Engagement**: Establishing a network of alumni who can share their experiences and insights can provide current students with valuable guidance and mentorship.

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

The Department of Physics at SLIET Longowal can enhance its teaching-learning process through several focused strategies aimed at modernizing education and improving student outcomes. Below are key areas of improvement:

Incorporating Modern Teaching Methodologies

- ✓ **E-Learning Resources:** Integrate online platforms and resources that provide access to a wide range of educational materials, including recorded lectures, simulations, and interactive modules.
- ✓ **Multimedia Teaching Tools:** Utilize multimedia presentations, videos, and animations to explain complex concepts, making learning more engaging and accessible.
- ✓ **Smart Classrooms:** Invest in smart classroom technologies that facilitate interactive teaching, allowing for real-time feedback and participation from students.
- ✓ **Strong Feedback System:** Establish a structured feedback system that encourages students to share their learning experiences, which can be implemented through regular surveys and focus group discussions.

Increasing Student Engagement

- ✓ **Interactive Learning Experiences:** Introduce hands-on experiments, practical demonstrations, and collaborative projects to promote active participation and experiential learning.
- ✓ **Problem-Based Learning (PBL):** Encourage students to work on real-world problems in groups, fostering critical thinking and teamwork skills.
- ✓ **Peer Teaching and Learning:** Promote peer teaching initiatives where students can share knowledge and help each other, enhancing understanding through collaboration.

Fostering a Supportive and Inclusive Learning Environment

- ✓ **Inclusive Practices:** Ensure that teaching methods cater to diverse learning styles and needs, providing additional support for students who require it.
- ✓ **Mentorship Programs:** Develop mentorship initiatives where senior students or faculty members guide and support junior students academically and personally.
- ✓ **Open Communication Channels:** Create an environment where students feel comfortable voicing concerns or asking for help, fostering a culture of support and collaboration.

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Continuous Feedback and Assessment Mechanisms

- ✓ **Formative Assessments:** Implement regular formative assessments to gauge student understanding and progress, allowing for timely adjustments to teaching strategies.
- ✓ **Personalized Learning Plans:** Use assessment data to create individualized learning plans that address the unique strengths and weaknesses of each student.
- ✓ **Feedback Loop:** Establish a continuous feedback loop where students can provide input on teaching effectiveness, course materials, and their learning experiences, which can inform future improvements.

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

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

The Department of Physics at SLIET Longowal is committed to ensuring that its laboratories and research facilities are utilized effectively to enhance the academic and research experiences of students and faculty. Below are key points regarding the current status and future plans for the laboratories:

Optimal Utilization of Laboratories

- ✓ **Maximizing Laboratory Time:** Scheduling laboratory sessions efficiently to ensure that all students have adequate access to equipment and resources, thus enhancing hands-on learning experiences.
- ✓ **Research and Development:** Encouraging faculty and students to engage in research projects that utilize existing equipment, fostering a culture of innovation and inquiry.
- ✓ **Interdisciplinary Use:** Promoting the use of physics laboratories for interdisciplinary projects that involve collaboration with other departments, thus broadening the scope and impact of research.

Continuous Improvement of Equipment

- ✓ **Regular Updates:** Conducting annual assessments to identify the need for new equipment or upgrades to existing facilities, ensuring that the department remains at the forefront of technological advancements in physics.

Recent Major Equipment Acquisitions

The following major equipment has been procured in recent years to enhance research and teaching capabilities:

- ✓ **Hall Effect Apparatus:** Used for measuring the Hall coefficient of materials, this equipment is essential for studies in solid-state physics and material science.
- ✓ **Centrifugation Machine:** This machine is valuable for separating mixtures and conducting experiments related to fluid dynamics and material separation.
- ✓ **X-Band Microwave Test Bench (Klystron Tube):** This setup is crucial for experiments in microwave technology, providing students with hands-on experience in wave propagation and microwave engineering.

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- ✓ **X-Band Microwave Gunn Diode:** A key component for microwave generation experiments, allowing students to explore the principles of microwave transmission and applications.
- ✓ **Density Meter:** This instrument is essential for measuring the density of various materials, facilitating experiments in fluid mechanics and material characterization.
- ✓ **Computer Workstation:** Upgraded computer workstations support computational physics experiments, data analysis, and simulations, enhancing the overall research capabilities of the department.

10. Any other point

The Department of Physics at SLIET Longowal has undertaken several initiatives to bridge the gap between offline and online teaching, improve student engagement, and support local educational efforts. Below are key highlights of these initiatives:

Development of Online Resources

Video Lectures: To facilitate better understanding and engagement, Prof. K.S. Kahlon and his team have created a series of instructional videos for the following courses:

BSPH-1031 and BSPH-104: Experimental physics courses where hands-on experimentation is crucial.

BSPH-402: A comprehensive laboratory course for undergraduate students.

E-Lab Manuals: Detailed e-lab manuals for Computational Physics (M.Sc.) have also been developed, providing students with accessible resources for self-directed learning.

Public Access: These resources are publicly available and can be accessed through the following links:

- BSPH-1061 Video Lectures
- BSPH-107 Video Lectures
- BSPH-402 E-Lab Manual

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Flip books:

https://online.fliphtml5.com/gscha/ykux/ **BSPH 402**

https://online.fliphtml5.com/gscha/hapv/ **PH 8151**

https://online.fliphtml5.com/gscha/otnk/ **PH121/BSPH-107**

https://online.fliphtml5.com/gscha/nyso/ **PH 8251**

https://online.fliphtml5.com/gscha/rlyc/ **PH 111/ BSPH-106**

https://online.fliphtml5.com/gscha/gknb/ **PH 9151**

Support for Struggling Students

Special Coaching Programs: Recognizing the diverse learning needs of students, the department offers targeted coaching in both theoretical and practical components for weaker students enrolled in the Integrated Certificate Diploma (ICD) program. This initiative ensures that all students have the opportunity to succeed in their studies.

Community Engagement and Social Welfare

Coaching for Local Students: In 2024, the department actively participated in an initiative to provide free coaching classes to 10th-grade students from nearby villages. This program was conducted in collaboration with the Mathematics and Chemistry departments, aiming to prepare these students for the SET-I entrance test for the ICD program.

Impact: The initiative was highly successful, with approximately 100 students gaining admission to the ICD program. This achievement not only reflects the effectiveness of the coaching provided but also emphasizes the department's commitment to supporting local communities and enhancing educational opportunities for underprivileged students.

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C. Departmental Infrastructure

C.1	Departmental resources	Score		Remarks
		Self-assessment	Expert assessment	
1	Adequacy of Class Rooms and Multi-Media Facility	7 (10)	7	**Multimedia Smart Classroom Teaching:** • Target Groups: Postgraduate (PG) and Undergraduate (UG) students. • Availability: Smart classrooms are utilized on an availability basis, providing an interactive and engaging learning environment that incorporates various multimedia tools. **Traditional Classroom Teaching:** • Target Groups: Integrated Certificate Diploma (ICD) and Undergraduate (UG) programs. • Description: Simple classroom settings are used for instruction, ensuring foundational teaching is accessible to all students, particularly those in the ICD program. **Multimedia Facilities in Laboratories:** • Target Groups: ICD UG and PG programs. • Description: Laboratories are equipped with multimedia facilities that enhance practical learning experiences, allowing students to engage with experimental demonstrations and data analysis effectively. **Movable Multimedia Facilities:** • Usage: Movable multimedia facilities are available within the department and can be utilized for classroom teaching in ICD and UG programs. • Benefits: This flexibility allows faculty to adapt teaching methods to various classroom settings, improving accessibility and engagement.

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				Non-availability of classroom and laboratory for B.Sc. Courses.
2	Availability of Laboratories	7 (10)	7	**Laboratory Space Availability:** • Sufficient Space: The department has sufficient laboratory space allocated for all levels of study, including Integrated Certificate Diploma (ICD), Undergraduate (UG), Postgraduate (PG), and research programs. This ensures that all students have access to necessary facilities for practical learning. **Well-Equipped Laboratories:** • Comprehensive Equipment: Laboratories are well-equipped to meet the experimental and research needs of students across all programs. This enhances the practical understanding of theoretical concepts and supports hands-on learning experiences. **Computational Physics Laboratory:** • Facilities: A dedicated Computational Physics laboratory is available for the PG program, equipped with 30 personal computers (PCs). This facility allows students to engage in computational modeling, simulations, and data analysis, essential for modern physics education. **Multimedia Facilities in Laboratories:** • Multimedia facilities are available in laboratories for both ICD and UG programs. This integration of technology supports enhanced learning through visual demonstrations, interactive experiments, and improved data presentation. Annexure-C1. I. **Non availability of UG-laboratory for B.Sc. Courses.**

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3	Availability of Conference/Seminar Room, etc.	7(10)	7	• Conference/Seminar Hall room is not available exclusively at department and shared at institute level • Seminar Hall is also shared with T&P Department • Capacity of the conference/seminar hall >250 person
4	Availability of Seating Space for Faculty and Research Students	7 (10)	7	• Adequate number of faculty rooms are available but not as per designation • Adequate sizes of faculty rooms • Adequate seating space is not available for research students in the department but needs improvement • Adequate seating space is available for technical staff with in labs • Adequate seating space is available for supporting staff in the department
5	Availability of Internet Services in Research Labs and Class Rooms	8 (10)	8	• Wired LAN connections and Wi-Fi signals are available in all faculty, research scholar, technical staff and supporting staff rooms, laboratories and classrooms. • Internet speed and continuity need to be improved. • Wi-Fi speed and continuity need to be improved.
6	Departmental Library and E-Resources	9 (10)	9	**Library Services:** The Department of Physics offers effective library services to all students, with a particular emphasis on supporting Undergraduate (UG), Postgraduate (PG), and research scholars. This ensures that all students have access to the resources they need for their studies and research. **Collection of Books:** The departmental library houses a collection of 750 books that cover a wide range of topics in physics. This includes: Fundamental principles of physics, Specialized subfields (e.g., condensed matter physics, nanotechnology)

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				Research methodologies, Related subjects to support comprehensive learning **Thesis Collection:** M.Sc. and Ph.D. Theses: The library contains 150 M.Sc. project theses from past students, along with 27 Ph.D. theses from former scholars. This collection provides valuable insights into completed research projects and can serve as references for current students. **Access to E-Books:** The departmental library provides access to a variety of E-books on different topics from various publishers, facilitating a broader reach of information and resources for students and faculty. **Central Library Resources:** The Central Institute Library complements departmental resources by offering a vast collection of e-resources for teaching and learning. These resources are easily accessible to both faculty and students, enhancing the overall educational experience. Annexure-C1. II.
7	Computing Facilities and Software	9 (10)	9	**High-Performance Devices:** All faculty members and research scholars are equipped with table-top PCs, laptops, and iPads featuring the latest configurations to support their research and teaching activities. **Printing Facilities:** Each faculty member has access to printers-cum-scanners in their rooms, facilitating efficient document management. Centralized printing facilities are available for students and research scholars, ensuring easy access for their printing needs.

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				Computer Workstation: The department has a dedicated computer workstation for computational studies, equipped with essential software like Quantum Espresso and Win2K. This workstation supports advanced simulations and computational research. **Computational Physics Lab:** A dedicated Computational Physics Lab is available for PG students, where they can apply computational methods, conduct simulations, and utilize numerical techniques to solve complex problems in physics. This hands-on facility enhances their practical skills and understanding. **Access to Online Resources** Students and faculty have access to scientific databases and online resources, which facilitate research and keep them updated with the latest developments in physics. **Skills Development** The department promotes skills development by providing resources for learning commonly used coding languages such as: Python, MATLAB, Mathematica and C++ These coding languages are vital for computational physics and research. **Need for Professional Software** While the department is well-equipped with various resources, there is a requirement to acquire additional professional software to further enhance the research capabilities of faculty and students. Annexure-C1. III.
8	Adequacy of Offices and Furnishing for Faculty	8 (10)	8	Faculty rooms, technical staff rooms, supporting staff rooms, laboratories, class rooms are well furnished with adequate furniture (table and chairs), white boards, and other materials

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				like window mess, fans, ACs, computers, printers, UPS, LAN connections and Wi-Fi signals
9	Faculty- Student Ratio	9 (10)	9	As per institute records following AICTE and UGC guidelines
10	Support Staff (Technical/Administrative) Adequacy	9 (10)	9	Adequate number of technical staff in laboratories as well as supporting/administrative staff in office are available.
	Total Score (out of 100)	**80**	**80**	

SWOT Analysis of the Department of Physics, SLIET Longowal

Strengths

- **Diverse Research Areas:** Strong emphasis on experimental and theoretical physics, including material science, nanotechnology, and radiation physics, attracting students and funding.
- **Qualified Faculty:** Faculty members with advanced degrees, diverse research backgrounds, and active participation in national and international conferences.
- **Robust Infrastructure:** Well-equipped laboratories with modern equipment, facilitating hands-on learning and research opportunities for students.
- **Collaboration Opportunities:** Established collaborations with national institutes (e.g., IITs, IUAC) and international projects (e.g., ZEUS experiment) enhance research capabilities.
- **Community Engagement:** Active involvement in local educational initiatives, providing free coaching to underprivileged students, enhancing the department's reputation and social responsibility.

Weaknesses

- **Shortage of faculty:** Limited number of faculty members, affecting the student-to-teacher ratio and the ability to offer diverse courses.
- **Limited Funding:** Currently, there are no externally funded projects, which may hinder the department's growth and research initiatives.
- **Faculty Development Needs:** Ongoing need for faculty training in modern pedagogical methods and the integration of technology in teaching.
- **Retention of Students:** Challenges in maintaining student interest and engagement in physics due to competition from other disciplines.

Opportunities

- **Emerging Research Trends:** Growing interest in nanotechnology, renewable energy, and environmental science presents opportunities for new research projects and funding.
- **Interdisciplinary Programs:** Potential to develop interdisciplinary courses and collaborations with other departments (e.g., Chemistry, Electronics) to enhance curriculum relevance.
- **International Collaborations:** Establishing partnerships with global institutions for joint research projects, exchange programs, and faculty

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development.

- **Increased Online Education:** Expanding online learning platforms and resources to attract a broader audience and enhance learning experiences for remote students.

Threats

- **Funding Cuts:** Potential reductions in the departmental funds could impact research and infrastructure development.
- **Rapid Technological Changes:** Keeping up with rapid advancements in technology and research methodologies may pose challenges for faculty and students.
- **Shifts in Student Preferences:** Changing career preferences among students towards other field may affect physics enrollment numbers.

Suggestions for improvement:

Encourage Research Project Submissions:
Faculty members should be motivated to submit more research projects to various funding agencies. Regular workshops can be organized to help faculty understand funding processes and enhance proposal writing skills.

Pursue Awards and Recognitions:
Faculty members should actively apply for national and international awards and recognitions to enhance the department's prestige. A dedicated committee could assist in identifying suitable awards and preparing applications.

Establish Industrial Collaborations:
Form partnerships with industries to create job prospects and internships for postgraduate students. This can include guest lectures, collaborative projects, and consultancy work to bridge the gap between academia and industry.

Focus on High-Impact Research Publications:
Faculty should prioritize publishing research papers in high-impact factor journals. Regular seminars and workshops can be held to guide researchers on how to identify suitable journals and improve their writing and submission strategies.

Implement Mock Test Series for Competitive Exams:
Initiate a series of mock tests for postgraduate students preparing for NET/GATE and similar competitive exams. This could include workshops on exam strategies and review sessions to discuss common challenges.

Encourage Quality Research Presentation:
Research scholars should be supported in producing quality research work and encouraged to present at various conferences and seminars. This could involve mentorship programs and funding assistance for attending events.

Enhance Placement Opportunities:
Create a robust placement cell that actively seeks opportunities for PG and Ph.D. graduates. This can involve organizing placement drives, networking events, and collaborations with industry partners to facilitate job placements.

Promote Entrepreneurship Activities:
Encourage students to engage in entrepreneurship activities by offering workshops, mentorship programs, and resources to support startup initiatives. Collaboration with business incubators can provide additional support.

Encourage Internal PG Students to Pursue Ph.D.:
Promote the benefits of pursuing a Ph.D. among current PG students. Information sessions and mentorship from current Ph.D. scholars can help address

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concerns and highlight the advantages of advanced studies.

Outreach to Nearby Colleges:

Actively contact nearby colleges to motivate their students to enroll in the PG program. Organizing outreach programs, workshops, or seminars can help raise awareness about the department and its offerings.

D. Outcomes

D.1	**Placement/ higher studies/ Publications/ Consultancy, Ph.D. awarded etc.**	**Score**		**Remarks**
		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	OICD OUG 02 (02) 02 (02)	- - 2 2	*OICD- another department program *OUG- another department program Placement Data for PG Student (Annexure-D. I) 100% of Ph.D. Students are placed
2	Average No. of Ph. Ds Awarded per Year	3(10)	3	1 (Based upon data of last 3 years)
3	Publications per Faculty in Indexed Journals/Year (Average of last three years)	10 (10)	10	• Avg. no. of publications/faculty in last academic year ≥ 2 • List of publications for last three years 2021, 22, 23 and 2024 is attached as (Annexure-A4.III) • Information is also uploaded on the public domain at: • This information has been uploaded in public domain at: http://phy.sliet.ac.in/faculty-staff/ and http://phy.sliet.ac.in/recent-publications
4	Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus)	10 (10)	10	• Citation list of publications for last three years 2022, 23, 24 is attached as (Annexure-D. II) • Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus) ≥25
5	Recognitions; Awards (National/International) to Faculty/Students	10 (10)	10	• All Faculty members of the department and some research scholars are recognized as reviewers of reputed research journals • All Faculty members are Ph.D. thesis examiners to many reputed universities/institutes • Faculty members are chairman/speakers/editors to different national conferences

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				• Faculty members are expert speakers to different universities/institutes • All Research scholars have represented in various national and international conferences • Kailash (Ph.D. Student in Physics Department) with registration no. PPH-2131 has received the prestigious Raman-Charpak Fellowship-2023 funded by Department of Science and Technology, Government of India, Service for Science and Technology (SST), French Embassy in India / Ambassade de France en Inde and Ministry of Foreign Affairs & International Development, Govt. of France. • Mr. Nikhil Kumar, M.Sc. (Physics) final year student has been selected as a researcher for the purpose of carrying out a research project at Friedrich-Schiller-Universität Jena (Germany) for a period 01.07.2024 to 30.06.2027 with a monthly gross pay of Euro 2831.14. • Abhishek Verma M.Sc.-22 student of Physics Department got the second prize for his poster on the theme, "Quantum Computing: An Introduction" presented under Poster Session-II: M.Sc. and M.Tech. students (Cluster V) in Two Day Workshop on Global Women's Breakfast-2024 (an IUPAC initiative), organized by Department of Chemistry, S.L.I.E.T. Longowal on February 21-22, 2024.
6	Consultancy and Externally Funded Projects	0 (10)	0	Currently, there are no externally funded or sponsored research projects active in the department. A FIST (Fund for Improvement of S&T Infrastructure) project has been submitted and is currently under processing.
7	No. of Ph.D. graduates who took Academics as Career (Last 5 Years)	9 (10)	9	• Over the last five years, all (8 out of 8) Ph.D. graduates have chosen to pursue careers in academia, securing positions in various government and private universities, colleges, and research institutes. • This achievement and the profiles of notable alumni are documented and can be accessed on the department's official website: Notable Alumni - Department of Physics.

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8	Students offered for higher studies	9 (10)	9	• Approximately 25% of students from each graduating batch have opted for higher studies, reflecting a strong inclination towards further academic achievement. • Details regarding student outcomes, including those pursuing higher education, can be found on the department's official website: Notable Alumni - Department of Physics.
9	No. of qualified students NET/GATE/CAT etc (State/Central Civil Services)	8 (10)	8	• Approximately 20% of students from each graduating batch have successfully qualified for the National Eligibility Test (NET) and Graduate Aptitude Test in Engineering (GATE). • Two M.Sc. (Physics)/22 students SOUMIK BHOWMIK, Regd. No. PHY-2263001 and VIVEKANAND JAKHAR, Regd. No. PHY-2263006 have qualified GATE-2024.
10	Entrepreneurship	0	0	Science students generally do not go for Entrepreneurship but needs to be encouraged
	Total Score (out of 100)	**63**	**63**	

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SANT LONGOWALINSTITUTE OF ENGINEERING & TECHNOLOGY
(Deemed-To-Be-University)
LONOGOWAL-148106
ACADEMIC AUDIT (2023-2024)

SUMMARY SHEET

1.	Name of the Department	**Physics**	
2.	Name of Reviewer Designation & Address	**From Academia**	**From Industry**
		1. Dr. SS Verma, HOD Physics, SLIET Longowal 2. Dr. Indraj Singh, Associate Dean (ICD & UG), SLIET Longowal 3. Dr. KS Kahlon, Professor, SLIET Longowal 4. Dr.HR Ghatak, Professor (ChE), SLIET Longowal 5. Dr. PK Dhiman, Professor (M&H), SLIET Longowal 6. Dr. SK Tripathi, Professor and Chairman, Department of Physics, Panjab University, Chandigarh	
3.	Date of Meeting		

Score Summary

Academics (A)				Research (Max Score 100) (B)	Departmental Infrastructure (Max Score 100) (C)	Outcome (Max Score 100) (D)	Total Score (700) (A+B+C+D)
ICD Programme (Max Score 100) (A.1)	UG Programme (Max Score 100) (A.2)	PG Programmme (Max Score 100) (Average of all PG programs) (A.3)	Doctoral Programmme (Max Score 100) (A.4)				
78	79	90	76	77	80	63	543 (77.57%)

Note: 1. Marks mentioned above are 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.

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More information available on departmental website:

http://phy.sliet.ac.in/

Google Drive (Public platform) link for the following attached material:

https://drive.google.com/drive/folders/1auRPTqv27HdPwMkKWyuSAt2qrmRPL-uX?usp=sharing

Item No. A: Academics

S.No.	Annexure	Information (Item)
1.	Annexure-A1. I	Class notes and practical manuals in Hindi and Punjabi
2.	Annexure-A1. II	Video displays of practical
3.	Annexure-A2. I	Theory notes and practical manuals on BSPH-401 and BSPH-402 courses
4.	Annexure-A2. II	Students Satisfaction Survey
5.	Annexure-A2.III	Syllabus feedback and action taken report
6.	Annexure-A2. IV	Video displays of practical for class
7.	Annexure-A3. I	Students Satisfaction Survey
8.	Annexure-A3. II	Syllabus feedback and action taken report
9.	Annexure-A3. III	Monitoring and continuous evaluation of the project work
10.	Annexure-A4. I	Laboratory and research facilities
11.	Annexure-A4. II	List of major equipment in the departmental laboratories
12.	Annexure-A4.III	List of Publication for last three years (2021,22, 23)

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13.	Annexure-A4. IV	Participation of Research Scholars in Conferences/Workshops

Item No. B: Research

S.No.	Annexure	Information (Item)
1.	Annexure-B. I	Research Ambience in the Department

Item No. C: Departmental Infrastructure

S.No.	Annexure	Information (Item)
1.	Annexure-C. I	Laboratory and research facilities, List of major equipment in the departmental laboratories
2.	Annexure-C. II	Departmental Library and E-Resources
3.	Annexure-C. III	Computing Facilities and Software

Item No. D: Outcomes

S.No.	Annexure	Information (Item)
1.	Annexure-D. I	Placement Data for PG Student
2.	Annexure D-II	Citation list of publications for last three years 2021, 22, 23

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