रसायन अभियांत्रिकी विभाग
Department of Chemical Engineering
संत लौंगोवाल अभियांत्रिकी एवं प्रौद्योगिकी संस्थान
SANT LONGOWAL INSTITUTE OF ENGINEERING AND TECHNOLOGY
(भारत शासन, शि. म. अधीन, सम विश्वविद्यालय)
(Deemed to be University under MoE, Government of India)
लौंगोवाल - १४८१०६. संगरूर (पंजाब) भारत
Longowal -148106. Sangrur (Punjab) India

Ref. No. SLIET/ChE/ 692. Date:09.09.2021

From: Head of Department, Chemical Engineering
To: Dean (Academics)
Subject: Academic audit report of the Chemical Engineering Department for A/Y 2019-20 & 2020-21

With reference to the Office Order SLIET/Dean (A)/2021/750 dated August 05, 2021, please find enclosed the Academic Audit report for A/Y 2019-20 & 2020-21 of the Chemical Engineering Department held on September 06, 2021 for kind consideration.

Submitted please.

R.No. Dean (Acad.) 860
Dated: 10/9/2021

10/9/2021

PS

9/9/2021
HOD (ChE)

CC.:
a) File copy

रसायन अभियांत्रिकी विभाग
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Longowal -148106. Sangrur (Punjab) India

ACADEMIC AUDIT

(2019-20) & (2020-21)

September 06, 2021

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY

ACADEMIC AUDIT (2019-20 and 2020-21)

PROFORMA OF ASSESSMENT

1. **Name of the Department : Chemical Engineering**

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

Prof. Shishir Sinha, IIT Rorkee
Prof. J. S. Dhilon, Dean (Academics), SLIET
Prof. Rajesh Kumar, Mechanical Engineering, SLIET
Prof. Parveen Kaur Khanna, Head, M &H, SLIET
Prof. Avinash Thakur, Head, Chemical Engineering, SLIET
Prof. Kamlesh Kumari, Chemical Engineering, SLIET

3. **Date of Review: September 06. 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			
S.N.		Self assessment		Expert assessment	
		2019-20	2020-21	2019-20	2020-21
1.	Curriculum (Structure, Course Syllabi, Flexibility), Theory/ practical (contents/ratio).	8	8	8	8
2.	Equivalence and Relevance of curriculum at national level	10	10	10	10
3.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects (minor/major)]	10	10	10	10
4.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	10	10	10	10
5.	Tour/Training/Industrial visits/Internship opportunities provided during the year	7	7	7	7
6.	Effectiveness of Assisted Learning, Tutorial System for ICD Students/ Seminars (Refer Course File)	9	9	9	9
7.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	10	10	10	10

06/09/2021 06/09/2021 06/09/2021 06/9/2021

8.	Practical activities, non-academic and totally related to a specific trade for skill development and *developing expertise in a particular group of techniques.*	8	8	8	8
9.	Linkage of ICD programs to outcome based vocational education (Industry linkage)	6	6	6	6
10.	Availability of workshop type lab/laboratory for providing hand on training to the students for skill development	10	10	10	10
	Total Score (out of 100)	**88**	**88**	88	88
A.2	**UG Program**	**Score**			
		Self assessment		Expert assessment	
		(2019-20)	**(2020-21)**	**(2019-20)**	**(2020-21)**
1.	Curriculum (Structure, Course Syllabi, Flexibility)	9	9	9	9
2.	Status of study material developed by faculty for students	5	6	5	6
3.	Relevance of contents of courses taught to the students and scope of improvement (revision of syllabus, addition of new experiments)	8.5	7.5	8.5	7.5
4.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	8	8	7.5	8.5
5.	Modern teaching methods in practice other than the conventional methods E-Assisted Learning (i) Availability of Library Resources (ii) Multi-Media Assisted Teaching	6	8	6	8
6.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation) (i) Theory and tutorial (ii) Practical (case studies)	8	9	8	8.5
7.	Faculty–Student Interaction (Whether any slot is fixed for the students to interact with a teacher, after classes/labs	8	8	8	8
8.	Tour/Training/Industrial visits/Internship opportunities	8.5	7	8	7
9.	Effectiveness of Assisted Learning in Tutorial classes/seminars for Students	5	4	5	4
	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	4	4	4	4

06/09/2021 06/09/2021 06/9/2021

10	Placement %age/higher studies options (last three years)	7	5	7	5
	Total Score (out of 100)	**77**	**75.5**	76	76
A.3	**PG Program (Separate for each program)**	**Score**			
		Self assessment		Expert assessment	
S. N.		**2019-20**	**2020-21**	**2019-20**	**2020-21**
1.	Curriculum (Structure, Course Syllabi, Flexibility)	8.5	9	8.5	9
2.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]				
3.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)				
4.	Relevance of contents of courses taught to the students and scope of improvement				
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				
6.	Technical Societies/ Colloquium for Students i. Departmental Society ii. Student Chapter(s) of Professional Societies				
7.	Tour/Training/Industrial visits/Internship opportunities				
8.	Collaboration with other departments (within institute)				
9.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students				
10.	Monitoring and continuous evaluation of the project work assigned to the students (mechanism)				
	Total Score (out of 100)	**8.5**	**9**	8.5	9.

06/09/2021 06/09/2021 3 06/09/2021 06/9/2021

A.4	Doctoral (Ph.D) Programmes	Score			
		Self assessment		Expert assessment	
		2019-20	2020-21	2019-20	2020-21
1.	Intake of Ph.D Students	2	2.5	2	2.5
2.	Admission Process	10	10	10	10
3.	Pre-Ph.D Courses and Evaluation Process	10	10	10	10
4.	Breadth and Depth of Knowledge of Students	7	6	7	6
5.	Seminar/ Presentations and Technical Communication	8	10	8	9
6.	Research Facilities available in the Department	7	7	7	7
7.	Average No. of Research Students/Faculty	4	4	4	4
8.	Average No. of Research Papers of Ph. D Students (Indexed Journals)	10	10	10	9
9.	Average Duration to Complete Ph.D (years)	7.8	6.4	7.8	6.4
10.	Participation of Research Scholars in Conferences/Workshops	5	5	5	5
	Total Score (out of 100)	**66.8**	**71.9**	66.8	69.9

B. RESEARCH

Sr. No.		Score			
		Self-assessment		Expert assessment	
		2019-20	2020-21	2019-20	2020-21
1.	Research Ambience in the Department	7	8	7	8
2.	Research Awareness among Doctoral Students	6	7	6	7
3.	Thrust areas of research in the department	8	8	8	8
4.	Quality of Research	7	8	7	8
5.	Collaborations with other departments (within the institute) and at National, and International levels.	6	4	6	4
6.	Impact and Quality of Publications	8	9	8	9
7.	Relevance of Research to Knowledge Generation and Social Relevance	8	7.4	8	7.4
8.	Student Exposure for Attending Quality Conferences/Symposia	5	5	5	5
9.	Inter departmental collaborations	6	2	6	2
10.	Industry/externally funded sponsored research (Numbers and amount)	6	6	6	6
	Total Score (out of 100)	**67**	**64.5**	67	64.5

06/09/2021 06/09/2021 06.9.2021

General Comments on,

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

a) Action Plan (<u>Academic Standard</u>)

The quality of teaching will be improved by:

- Introducing skill-development courses leading to professional advancement.
- Carrying out frequent interaction with industry and aligning research with Industrial problems
- Starting of a new inter disciplinary UG and PG program
- Combining existing courses with specific hands-on learning
- Ensuring student-learning outcomes for each academic program.
- Arranging expert lectures by experienced faculty or scientists from National/International laboratories or institutes on latest developments in the subject.
- Procurement of software for design and Modeling & simulation of Chemical engineering processes like ASPEN/HYSIS etc. followed by imparting training to faculty and students.
- Integrating SCADA/DAC with conventional lab equipment /unit operation for online recording of DATA.
- Integrating conventional Chemical Engineering with artificial intelligence, bio informatics and nanotechnology etc.
- Setting up of technology incubators, Pilot plant and departmental workshop
- Setting up of Centre for excellence for Environment and Energy
- MoU with Industry, research institute for dissemination of knowledge and use of their research facilities.
- Amalgamation of courses/internship offered by different national and international bodies/organizations line SWYAM, NPTEL, course Era etc. along with regular curricula.

b) Action Plan (<u>Student Mentoring</u>)

- Help the students to lower stress and build confidence through effective counselling.
- Tailor mentoring style and content to the student to overcome differences based on factors including culture, ethnicity, gender, social background.
- Impart career guidance through an interpersonal engagement by sharing experience and expertise.
- Constructive interaction with a mentor and participation in collective activities.

c) <u>Short term goals</u>

- To upgrade laboratories and teaching learning infrastructure.
- Further enhancement of technical knowledge/skills upgradation of faculty and staff.
- To make extra efforts for starting master's program

06/09/2021 06/09/2021 5 06/09/2021 06.9.2021

d) **Long term goals**

- To get UG program accredited for six years by the NBA.
- To implement externally funded schemes for Ph.D. programme.
- To accomplish consultancy services through industries/research organizations.
- To procure specialized/high end equipment for chemical Engineering Labs

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

The department has been awarded with NBA accreditation for three years.

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

2020-21 (UG):

No. of placement (in-campus)	9
No. of placement (Higher Studies)	2
No. of placement (Total inclusive of Campus, higher studies & other))	11

2019-20 (UG):

No. of placement (in-campus)	14
No. of placement (Higher Studies)	4
No. of placement (Total inclusive of Campus, higher studies & other))	23

2018-19 (UG):

No. of placement (in-campus)	20
No. of placement (Higher Studies)	1
No. of placement (Total inclusive of Campus, higher studies & other))	33

2017-18 (UG)

No. of placement (in-campus)	10
No. of placement (Higher Studies)	6
No. of placement (Total inclusive of Campus, higher studies & other))	40

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.**

All the faculty and staff members are encouraged to regularly attend the training program. Recently many faculty members have enrolled themselves in AICTE approved comprehensive teachers training programs.

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

06/09/2021 06/09/2021 06/09/2021 06/09/2021 06/9/2021

- To implement it in the Chemical engineering department, suggestions are regularly invited from the faculty members regarding revisions in the syllabus, CO-PO mapping, attainment etc. Also, changes suggested by the students, if any, are also taken into consideration. Based on the suggestions received, matters are discussed in the DAAC meeting, and minutes are recorded and forwarded for further consideration in the Board of Studies.
- At the end of semester, feedback is taken from the students for continuous upgradation of teaching learning process.

6. Technical Societies/ Colloquium for Students

- Student Chapter(s) of Professional Societies
  - IEI chapter
  - IIChE Chapter
  - *ACT*

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

The rapid changes and increased complexity of today's world present new challenges and put new demands on our education system. There has been generally a growing awareness of the necessity to change and improve the preparation of students for productive functioning in the continually changing and highly demanding environment. In confronting this challenge, it is necessary to consider the complexity of the education system itself and the multitude of problems that must be addressed.

- Adapting teaching to different student characteristics by using diverse methods of teaching. Adaptation to the ability levels, patterns of different abilities, learning styles, personality characteristics, and cultural backgrounds.
- Integrating the curriculum by developing inter-disciplinary curriculum units that enable students to acquire knowledge from different disciplines through a unifying theme while having the opportunity to contribute in different and special ways to the objectives of the integrated units.

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

To better align with the today's research scenario, different specific research groups in the department are focusing the department research output.

Research Group(s)/Interdisciplinary groups(s)	
Research Groups (Broad Area of Research)	**Name of Faculty/RS Involved**
Environment Engineering and Energy Conversion	Dr. S M Ahuja, Professor, CHE Dr. Avinash Thakur, Associate Professor, CHE Dr. Gulshan Kumar Jawa Associate Professor, CHE Mr. Akash Sood, Rsearch Scholar

06/09/2021 06/09/2021 7 02/09/2021 06/9/2021

Bio sensors and Automations	Dr. Sandeep Mohan Ahuja, Professor CHE Dr. Surinder Singh, Professor, ECE
Polymer Engineering and Technology Biopolymers, Drug delivery	Dr. Kamlesh Kumari, Professor, CHE Dr. Dheeraj Sud, Prof. Chemistry Dr. H Chopra, Prof. Chemistry, Dr. P P Kundu, Prof. IIT Roorkee, Dr. Pawan Kumar, Sr. Tech.,CHE Dr. Navneet Kaur, Faculty, Chandigarh University Dr. Amit Rai, Assistant professor, CHE Dr. Nikhil Prakash Saxena, Assistant Professor, CHE Dr. Vinay Kumar Assistant professor, CHE
Process Modeling and Simulation,	Dr. Nikhil Prakash Saxena, Assistant Professor, CHE Dr. Amit Rai, Assistant Professor, CHE Ms. Subita Bhagat, Asistant professor, CHE
Biorefinery, paper making and Electrochemical treatment of waste water and biorefinery	Dr. A.SK. Sinha, Assistant Professor, CHE Dr. Pushpa Jha, Professor, CHE Dr. S. P. Singh, Professor, department of Paper technology, IIT Roorkee Dr. H. R. Ghatak, Professor, CHE Mr. Vinod Meena, Assistant Professor, CHE Mr. Sandeep Tripathi, ACIRD Yamunanagar Mr,Sandeep Singh, National Institute of Hydrology, Roorkee Mr. kaleem Ahamad, Research Scholar
Biochemical Engineering	Dr Avinsah Thakur, Associate Professor, CHE Dr P. S. Panesar, Prof., FET Mr. Anil kumar, Research Scholar

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

To augment the existing lab infrastructure new hardware and software equipment's are procured time to time. The equipment recently added are

- Supercritical Fluid Extraction System
- Pilot scale high efficiency cyclone separator
- Carbon capture and sequestration equipment
- Reciprocating pump test rig
- Computerized CSTR
- Ultra-sonication probe
- Microprocessor flame photometer

Repair and maintenance of the equipment as per requirement is carried out on routine basis and the equipment are being optimally utilized for hands on training to students. Also, recently the fire extinguishers have been refilled to meet the safety needs of the lab. During each financial year, for each lab fresh consumables as per the requirement have also been procured.

10. Any other point (n/a)

06/09/2024 8 06/09/2024 06/09/2024 06/9/2024

C. Departmental Infrastructure

S. No.	Infrastructure	Score			
		Self-assessment		Expert assessment	
		(2019-20)	(2020-21)	(2019-20)	(2020-21)
1	Adequacy of Class Rooms and Multi-Media Facility	6	7	6	7
2	Availability of Laboratories	6.5	6.5	6.5	6.5
3	Availability of Conference/Seminar Room, etc.	5	5	5	5
4	Availability of Seating Space for Faculty and Research Students	7	7	7	7
5	Availability of Internet Services in Research Labs and Class Rooms	7	7	7	7
6	Departmental Library and E-Resources	7	7	7	7
7	Computing Facilities and Software	7	7	7	7
8	Adequacy of Offices and Furnishing for Faculty	8	8	8	8
9	Faculty- Student Ratio	8	8	8	8
10	Support Staff (Technical/Administrative) Adequacy	7.5	7	7.5	7
	Total Score (out of 100)	**69**	**69.5**	69	69.5

SWOT analysis by the department:

Strengths:

1. Significant contribution of the faculty at Institute level in various capacities.
2. Experienced, Dedicated and highly qualified faculty in specialized areas with good number of publications in reputed journals (SCI indexed).
3. Contemporary curriculum as per guidelines by AICTE etc.
4. Research fellowships to support the research.
5. External funded project
6. Optimum utilization of existing laboratories and facilities
7. Good interactions with outer world.
8. Nominal fee structure

Weaknesses:

1. Limited interaction with Industry for accessing Industrial needs and carrying out industry specific research and consultancy project.
2. Lack of running informal courses.
3. Locational disadvantage

06/09/2021 06/09/2021 06/09/2021 06/9/2021

4. Due to effective placements of undergraduate students, the master's program is not running for the last couple of years resulting in very less number of research scholars thereafter.
5. Inadequate civil infrastructure.

Opportunities:

1. Starting of new interdisciplinary courses and PG courses for working professionals in line with NEP-2020.
2. To procure specialized/high end equipment for integrating conventional chemical engineering with latest state of the art technology to keep pace with fast changing global scenario
3. To establish Centre for skill development.
4. Establishment of Centre of Excellence in Environment and energy
5. To collaborate with industry for the designing and development of curriculum and laboratory experimentation for students as well as for providing technical guidance to budding entrepreneurs for starting their industry in local areas.

Threats:

1. Availability of lesser academic/ professional opportunities due to locational disadvantage.
2. Lack of enrollment in PG programs.
3. Major chunk of Punjab Youth migrating to oversees.

Suggestions for improvement:

- Regular faculty and staff against vacant positions must be appointed.
- Start of new courses at B.E./ ME level.
- Establishment of adequate facilities (Labs/ seminar halls/ classrooms/ innovation center, workshop, technology incubator, pilot plant, faculty rooms, Girls' Common room, bigger departmental library with digital facilities etc.)
- Aggressive promotion of the analytical/ research facilities of department to catch research scholars/ industry/ entrepreneurs etc.
- Purchase of Software like ASPEN Plus, AUTOCAD, CFD and dedicated software for designing air pollution control equipment, Energy conservation and wastewater minimization using pinch technology etc.
- Purchase and utilization of Equipment for PG and Research: LCMS, ICPMS, Electrolyzer, X-ray spectrometer, Semi batch polymerization reactor with control unit etc. and other state of art equipment.
- More effort is needed to increase the number of state/central government funded projects to strengthen the department.
- Academics and professional competency enhancement of faculty through various patents, research publications, consultancy, technology transfer and setting up of technology incubator etc.

06/09/2024 06/09/2024 06.9.2024

➢ Participation of students/ staff/ faculty in various conferences/ seminars/ workshops to enhance the quality and the exposure and to enhance the interaction with outside world must be increased.

D. Outcomes

S. no.		Score			
		Self-assessment		Expert assessment	
		2019-2020	2020-2021	2019-2020	2020-2021
1	i. Placements for ICD ii. Placement of B. Tech iii. Placement of Masters Student iv. Placement of Ph. D Students	2 3 0 2	2 1 0 2	2 3 0 2	2 1 0 2
2	Average No. of Ph. Ds Awarded per Year	6	3	6	3
3	Publications per Faculty in Indexed Journals/Year (Average of last three years)	6	6	6	6
4	Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus)	6	8	6	8
5	Recognitions; Awards (National/International) to Faculty/Students	2	0	2	0
6	Consultancy and Externally Funded Projects	6	6	6	6
7	No. of Ph.D. graduates who took Academics as Career (Last 5 Years)	10	10	10	10
8	Students offered for higher studies	4	2	4	2
9	No. of qualified students NET/GATE/CAT etc (State/Central Civil Services)	4	2	4	2
10	Entrepreneurship	2	2	2	2
	Total Score (out of 100)	**53**	**44**	53	44

Comments & Suggestions for Improvement

1. Faculty members should put effort for consultancy.
2. Faulty members should submit research projects at lest one per year/faculty member
3. Industry institute linkage to be strengthened.
4, More Industrial tours for students be organized
5. Practical related to case studies be incorporated.
6. Efforts should be made towards running PG program.
7. Students should be guided for clearing GATE, Opting for higher studies & entrepreneurship etc.

06/09/2021 06/09/2021 06/09/2024 06/9/2024

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY

ACADEMIC AUDIT (2019-20 and 2020-21)

SUMMARY SHEET

1.	Name of the Department	Chemical Engineering	
2.	Name of Reviewer Designation & Address	From Academia	From Industry
		Dr. Shishir Sinha, IIT Roorkee	---
3.	Date of Meeting	Sept. 06, 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)									
2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021
88	88	76	76	8.5	09	66.8	69.9	67	64.5	69	69.5	53	44	428.3	420

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.

06/9/2021

(Avinash Thakur)

Name & Signature of HOD

Signature of committee members:

6/9/2021
(Kamlesh Kumari)

06/09/2021
(Avinash Thakur)

06/09/2021
(Parveen Kaur Khanna)

06/9/2021
(Rajesh Kumar)

06/9/2021
(J. S. Dhillon)

(Shishir Sinha)