

**SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY**

(Deemed-To-Be-University)

LONOGOWAL-148106

**ACADEMIC AUDIT (2021- 2022)**

**PROFORMA OF ASSESSMENT**

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

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

Prof. Pushpa Jha, HOD (Chemical Engineering), SLIET

Prof. Rajesh Kumar, Dean (SW), SLIET

Prof. Avinash Thakur, Faculty (Chemical Engineering), SLIET

Prof. P.K. Singh, Faculty (Mechanical Engineering), SLIET

Prof. Pardeep Kumar Jain, Faculty (M&H), SLIET

Prof. M.K.Jha, **External Expert**, Dept. of Chemical Engineering, NIT, Jalandhar

3. **Date of Review:** 09/12/2022

**NOTE:**

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

**A. ACADEMICS**

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

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	Students		
8.	Practical activities, non-academic and related to a specific trade for skill development and <i>developing expertise in a particular group of techniques.</i>	8	8
9.	Linkage of ICD programs to outcome-based vocational education (Industry linkage)	6	6
10.	Availability of workshop-type lab/laboratory for providing hands-on training to the students for skill development	10	9
	<b>Total Score (out of 100)</b>	<b>89</b>	<b>85</b>

A.2	UG Programme	Score	
		Self-assessment	Expert assessment
1.	Curriculum (Structure, Course syllabi, Flexibility, Choice based credit system)	8	8
2.	Status of study material developed by faculty for students	10	8
3.	Relevance of contents of courses taught to the students and scope of improvement (revision of syllabus, the addition of new experiments)	8	8
4.	Formal academic load on students [Teaching, Laboratory/Practical, Projects(minor/major)]	10	10
5.	Modern teaching methods in practice other than the conventional methods E-Assisted Learning (i) Availability of Library Resources (ii) Multi-Media Assisted Teaching	10	10
6.	Evaluation Process (Continuing Evaluation and End-Term Evaluation) (i) Theory and tutorial (ii) Practical (case studies)	10	9
7.	Faculty-Student Interaction (Whether any slot is fixed for the students to interact with a teacher after classes/labs)	10	10
8.	Tour/Training/Industrial visits/Internship opportunities	8	8
9.	(a) Effectiveness of Assisted Learning in Tutorial classes/seminars for Students	4	4
	(b) Faculty Mentoring/Faculty Advisor System for Students/Class of Students	4	4
10	Placement %age/higher studies options (last three years)	6	6
	<b>Total Score (out of 100)</b>	<b>88</b>	<b>85</b>

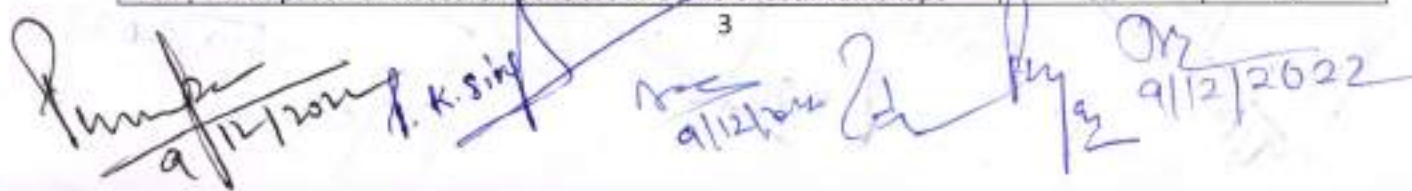
A.3	PG Programme (Separate for each programme)	Score
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		Self-assessment	Expert assessment
1.	Curriculum (Structure, Course Syllabi, Flexibility)	10	10
2.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	10	10
3.	Evaluation Process (Continuing Evaluation and End-Term Evaluation)	9	9
4.	Relevance of contents of courses taught to the students and scope of improvement	10	9
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	10	9
6.	Technical Societies/ Colloquium for Students i. Departmental Society ii. Student Chapter(s) of Professional Societies	6	6
7.	Tour/Training/Industrial visits/Internship opportunities	6	6
8.	Collaboration with other departments (within the institute)	6	6
9.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	10	8
10.	Monitoring and continuous evaluation of the project work assigned to the students (a mechanism)	10	9
<b>Total Score (out of 100)</b>		<b>91</b>	<b>86</b>

A. 4	Doctoral (PhD.) Programmes	Score	
		Self-assessment	Expert assessment
1.	Intake of PhD. Students	2	2
2.	Admission Process	8	8
3.	Pre-Ph.D. Courses and Evaluation Process	10	10
4.	Breadth and Depth of Knowledge of Students	4	4
5.	Seminar/ Presentations and Technical Communication	10	10
6.	Research Facilities available in the Department	6	6
7.	Average No. of Research Students/Faculty	2	2
8.	Average No. of Research Papers of Ph. D. Students (Indexed Journals)	4	4
9.	Average Duration to Complete PhD (years)	8	4
10.	Participation of Research Scholars in Conferences/Workshops	02	02


  
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	<b>Total Score (out of 100)</b>	<b>56</b>	<b>52</b>
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**B RESEARCH**

B.1	Research and Industrial collaboration	Score	
		Self-assessment	Expert assessment
1	Research Ambience in the Department	7	7
2	Research Awareness among Doctoral Students	10	10
3	Thrust areas of research in the department	10	10
4	Quality of Research	3	3
5	Collaborations with other departments (within the institute) and national and International levels.	10	6
6	Impact and Quality of Publications	10	10
7	Relevance of Research to Knowledge Generation and Social Relevance	10	9
8	Student Exposure to Attending Quality Conferences/Symposia	10	10
9	Inter-departmental collaborations	8	10
10	Industry/externally funded sponsored research (Numbers and amount)	6	6
	<b>Total Score (out of 100)</b>	<b>84</b>	<b>81</b>

**General Comments on,**

1. **Plan of action Plan of action of the department for the next five years (given NEP 2020)**

**a) Action Plan (Academic Standard)**

- To follow latest teaching techniques available.
- Students are encouraged to consult NPTL lectures available online.
- To include more of software based problems for assignments related to course work from time to time.
- To encourage discussion based teaching in class rooms.
- To organise industrial visits more frequently for ICD/UG/PG students for the needed exposure.
- Carrying out the frequent interactions with industry and aligning research with industrial problems.
- Introducing skill development courses leading to professional advancement.
- Starting of new inter disciplinary UG and PG program.
- Combining existing courses with specific hands-on learning.
- Ensuring student-learning outcomes for each academic program.
- Procurement of software for design and modelling & 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.

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## Department of Chemical Engineering Academic Audit: 2021-22

- 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 Center for excellence for Environment and Energy.
- MOU with Industry, research institute for dissemination of Knowledge and use of their research facilities.
- Amalgam of courses/ internship offered by different national and international bodies/organisations like SWYAM, NPTEL, etc along with regular curricula.

### b) Action Plan (Student Mentoring)

- Help the students to lower stress and build confidence through effective counselling.
- Small group of students are allotted to each faculty for counselling under Tutor-guardian system of the institute. Students can approach them for any sort of problems (personal or professional).
- Impart career guidance through an interpersonal engagement nby sharing experience and expertise.
- Constructive interaction with a mentor and participation in collective activities.

### c) Short term goals

- To organise expert talks from eminent personalities from academia.
- To organise workshop/conferences for the benefit of students.
- To organise talks from alumni established in Chemical Engineering fields.
- To upgrade laboratories and teaching- learning infrastructure.

### d) Long term goals

- To get the UG program accredited by NBA from time to time.
- To implement externally funded schemes for the PhD 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 NBA accreditation for three years.

## 3. The placement record of the department (Last three years)

### 2019-20 (UG):

No. of placement (in-campus)	14
No. of placement (Higher Studies)	04
No. of placement (Total inclusive of Campus, higher studies & other))	23

### 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

### 2021-22 (UG):

No. of placement (in-campus)	20
No. of placement (Higher Studies)	02
No. of placement (Total inclusive of Campus, higher studies & other))	29

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4. **Scope for training faculty/staff to further strengthen the teaching-learning process for strengthening the curriculum with the addition of new courses relevant at the National and International levels:**

All faculty and staff members are encouraged to attend the training program regularly. In addition, many faculty members have recently enrolled in AICTE-approved comprehensive teacher training programs.

5. **Effective/Continuous monitoring of faculty/staff in delivering the course contents (at departmental level) to enhance the teaching-learning process:**

(i) To implement it in the Chemical engineering department, faculty members regularly invite suggestions 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 review by the Board of Studies.

(ii) At the end of the semester, feedback is taken from the students for continuous up gradation of the teaching-learning process.

6. **Technical Societies/ Colloquium for Students**

(i) Departmental Society: **ACT**

(ii) Student Chapter(s) of Professional Societies

- IEI chapter
- AIChE Chapter

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 needs to be addressed.

- Adapting teaching to different student characteristics by using the 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.

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

To better align with today's research scenario, different specific research groups in the department are focusing on the department's 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 Pushpa Jha, Professor, CHE Dr H.R.Ghatak, Professor, CHE Dr. S M Ahuja, Professor, CHE Dr Avinash Thakur, Professor, CHE Dr Gulshan Kumar Jawa, Associate Professor, CHE Dr Bhajan Dass, Guest Faculty, CHE Mr Vinod Meena, Assistant Professor CHE Mr Akash Sood, Research Scholar, CHE Ms Purтика, Research Scholar, CHE Mr Kaleem Ahamad, Research Scholar, CHE
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. Nikhil Prakash Saxena, Assistant Professor, CHE Dr Amit Rai, Assistant professor, CHE Dr Pawan Kumar, Sr. Tech.,CHE Dr Navneet Kaur, Faculty, Chandigarh University Ms. Subita Bhagat, CHE
Process Modeling and Simulation,	Dr Avinash Thakur, CHE Dr. Nikhil Prakash Saxena, Assistant Professor, CHE Dr Amit Rai, Assistant Professor, CHE Ms Subita Bhagat, Assistant professor, CHE
Biorefinery, paper making and Electrochemical treatment of waste water and biorefinery	Dr H. R. Ghatak, Professor, CHE Dr A.SK. Sinha, Assistant Professor, CHE Dr S. P. Singh, Professor, department of Paper technology, IIT Roorkee Mr Vinod Meena, Assistant Professor, CHE Mr Kaleem Ahamad, Research Scholar
Biochemical Engineering	Dr Avinsah Thakur, Associate Professor, CHE Dr P. S. Panesar, Prof., FET Mr Anil Kumar, Guest Faculty, CHE

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**9. Strengthening laboratory infrastructure (adding new pieces of equipment and using the present facility for optimum use)**

- Ultrasonic Cleaner,
- Reciprocal Shaker,
- Orbital Shaking Incubator,
- Cannon Printers,
- UPS (KVA),
- LCD (Panasonic Tech. Solutions),
- Laptop (Dell),
- Probe Sonicator ( Bionics),
- Peristaltic Pump (Biotech System),
- Laminar Air Flow ( IGENE),
- High-Speed Overhead Stirrer.

10. Any other point: N/A

**C. Departmental Infrastructure**

C.1	Departmental resources	Score	
		Self-assessment	Expert assessment
1	Adequacy of Class Rooms and Multi-Media Facility	8	8
2	Availability of Laboratories	8	8
3	Availability of Conference/Seminar Room, etc	8	8
4	Availability of Seating Space for Faculty and Research Students	8	8
5	Availability of Internet Services in Research Labs and Class Rooms	10	10
6	Departmental Library and E-Resources	10	10
7	Computing Facilities and Software	10	10
8	Adequacy of Offices and Furnishing for Faculty	8	8
9	Faculty- Student Ratio	6	6
10	Support Staff (Technical/Administrative) Adequacy	6	6
Total Score (out of 100)		<b>82</b>	<b>82</b>

**SWOT analysis by the department :**

**Strengths:**

1. The Dept. of Chemical Engineering has experienced, Dedicated and highly qualified faculty in specialized areas with a good number of publications in reputed journals.
2. All the programmes have a contemporary curriculum as per guidelines by AICTE etc.
3. There are research fellowships to support the research.
4. Some faculty have externally funded sponsored projects.
5. There is optimum utilization of existing laboratories and facilities.
6. The department has good interactions with the outer world.
7. There is a nominal fee structure for all programmes of the department.

**Weaknesses:**

1. Limited interaction with Industry for accessing Industrial needs and carrying out industry-specific research and consultancy project.
2. Lack of running informal skill development courses.
3. Shortage of students in PG & Ph.D. programme.
4. Less number of Smart classroom.

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5. Seminar room & committee room on shared basis.

**Opportunities:**

1. We are starting new interdisciplinary and PG courses (Energy & Environment) 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 a centre for skill development.
4. To collaborate with industry to design and develop curriculum and laboratory experimentation for students and provide technical guidance to budding entrepreneurs to start their enterprises in local areas.

**Challenges:**

1. Lack of enrolment in PG programs.
2. A significant chunk of youth migrates overseas.

**Suggestions for improvement:**

1. Regular faculty and staff against vacant positions must be appointed.
2. Start new courses at B.E./ ME level, in Environment Engineering, Bio- chemical Engineering, Energy engineering & Pulp and paper technology.
3. Establishment of adequate facilities (Labs/ seminar halls/ classrooms/ innovation centre, workshop, a technology incubator, pilot plant, faculty rooms, Girls' Common room, more extensive departmental library with digital facilities etc.
4. Provision for sandwich master programme for working professionals.
5. M.tech by research programme similar to IIT Madras.

**D. Outcomes**

D.1	Placement/ higher studies/ Publications/ Consultancy, PhD awarded etc.	Score	
		Self-assessment	Expert assessment
1	i. Placements for ICD ii. Placement of B.Tech iii. Placement of Masters Student iv. Placement of Ph.D. Students	5	5
2	Average No. of Ph.Ds Awarded per Year	5	5
3	Publications per Faculty in Indexed Journals/Year (Average of last three years)	8	8
4	Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus)	10	10
5	Recognitions; Awards (National/International) to Faculty/Students	10	6
6	Consultancy and Externally Funded Projects	6	6
7	No. of PhD graduates who took Academics as a Career	10	10

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	(Last 5 Years)		
8	Students offered higher studies	2	2
9	No. of qualified students NET/GATE/CAT etc (State/Central Civil Services)	2	2
10	Entrepreneurship	2	2
	<b>Total Score (out of 100)</b>	<b>62</b>	<b>58</b>

**Comments & Suggestions for Improvement**

1. Faculty members must put effort into consultancy.
2. Faculty members must submit research projects at least 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 to be incorporated.
6. Efforts must be made towards running the PG program.
7. Students must be guided to clearing GATE, Opting for higher studies & entrepreneurship etc.

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**ACADEMIC AUDIT (2021-2022)**

**SUMMARY SHEET**

1.	<b>Name of the Department</b>	<b>Chemical Engineering</b>
2.	<b>Committee Members</b>	<ol style="list-style-type: none"> <li>1. Prof. Pushpa Jha, HOD (Chemical Engineering), SLIET</li> <li>2. Prof. Rajesh Kumar, Dean (SW), SLIET</li> <li>3. Prof. Avinash Thakur, Faculty (Chemical Engineering), SLIET</li> <li>4. Prof. P.K. Singh, Faculty (Mechanical Engineering), SLIET</li> <li>5. Prof. Pardeep Kumar Jain, Faculty (M&amp;H), SLIET</li> <li>6. Prof. M.K.Jha, <b>External Expert</b>, Dept. of Chemical Engineering, NIT, Jalandhar</li> </ol>
3.	<b>Date of Meeting</b>	<b>09-12-2022</b>

Score Summary							
Academics (A)				Research (Max Score 100)	Departmental Infrastructure (Max Score 100)	Outcome (Max Score 100)	Total Score (700)
ICD Programme (Max Score 100)	UG Programme (Max Score 100)	PG Programme (Max Score 100) (Average of all PG programs)	Doctoral Programme (Max Score 100)				
(A.1)	(A.2)	(A.3)	(A.4)	(B)	(C)	(D)	(A+B+C+D)
85	85	86	52	81	82	58	529

**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, the total score can be scaled to maximum marks.


  
Prof. Rajesh Kumar

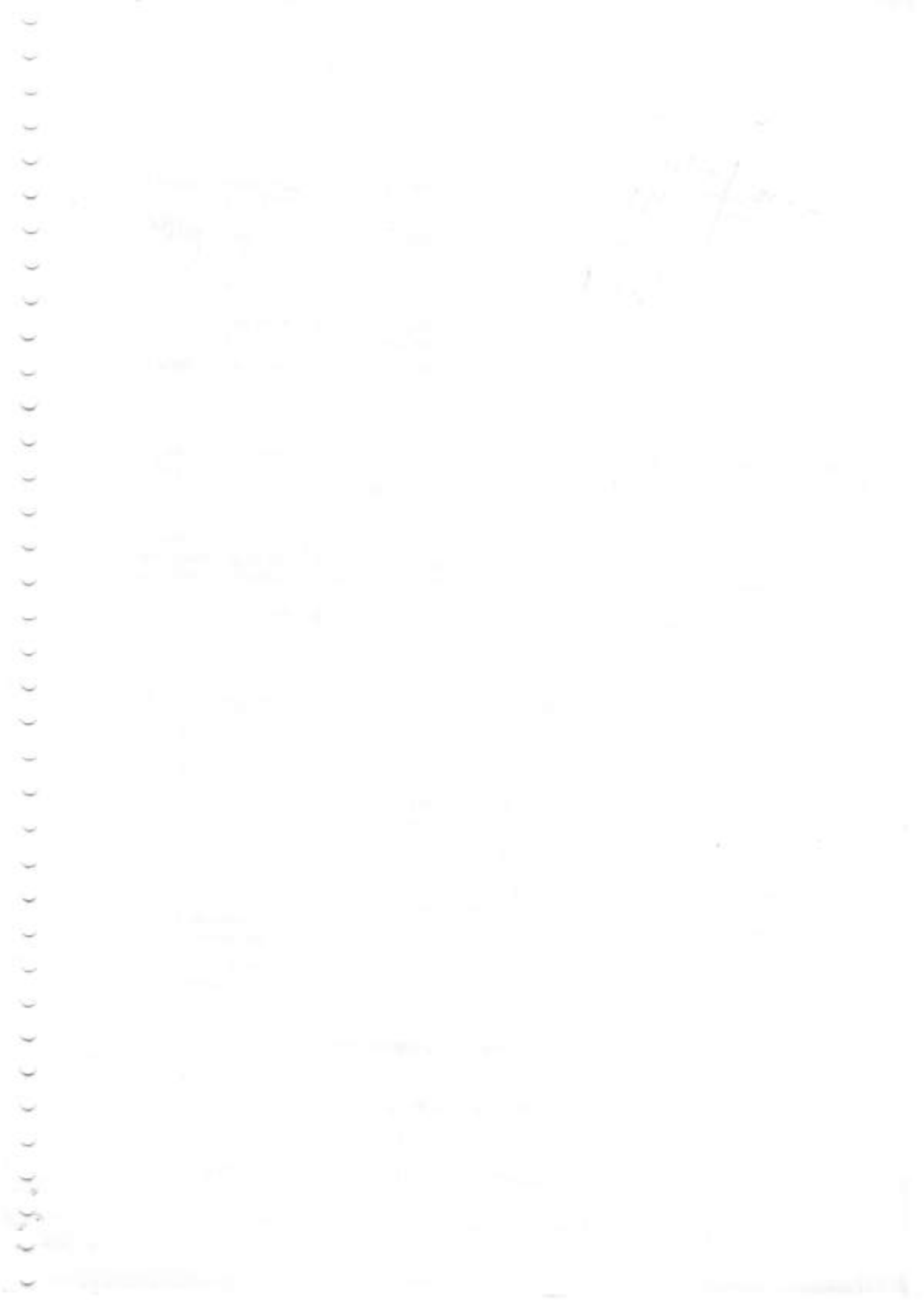
  
Prof. Pardeep Kumar Jain

  
Prof. Avinash Thakur

  
Prof. M.K.Jha

  
Prof. P.K. Singh

  
Prof. Pushpa Jha (HOD, ChE)



## Annexure-'I'

## A. ACADEMICS

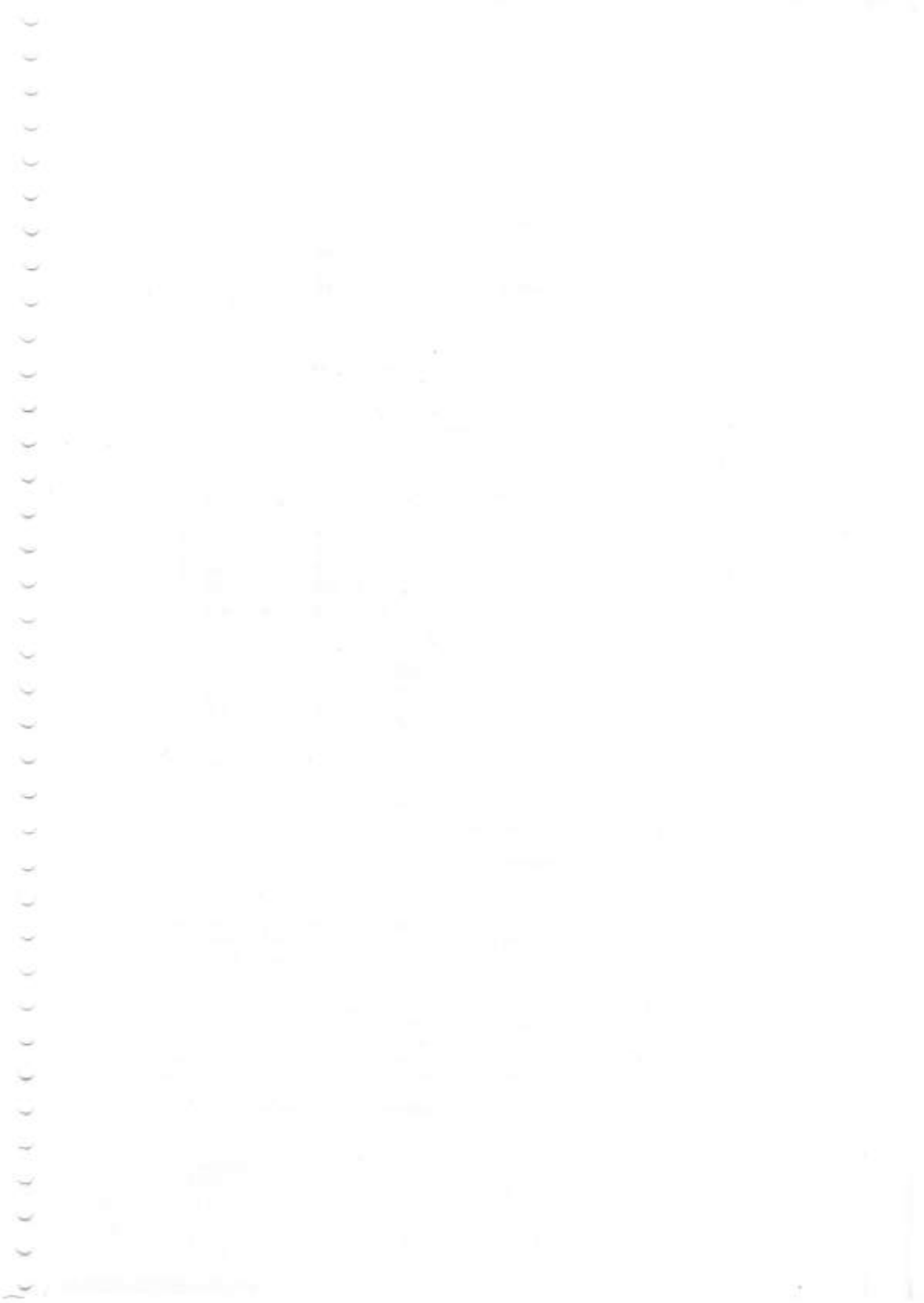
## A.1 ICD Program:

## 1. Curriculum (structure, course Syllabi, Flexibility), Theory/Practical (Contents/ratio)

**Structure:** As in most educational institutions, the teaching-learning process of SLIET Longowal is defined in terms of course credits; one credit is approximately equal to 1 hour of lecture class or 2-4 hours of laboratory per week. The course leading to the ICD program will ordinarily be three years. The 3-year ICD-programme shall consist of approximately 142 credits, including lectures, tutorials, practical and design work, project work, and special academic activities like in-house summer training, industrial training etc. In addition, it has separate courses for theory and laboratory components in the form of (3-0-0) or (3-1-0) theory courses and (0-0-4) laboratory courses. In addition, most of the subjects have one or two tutorial classes to enhance the numerical competency of the students related to their respective topics. In addition, the SLIET system offers two existing modes: one after completing two years (by taking a certificate) and another after finishing the entire course (by taking a diploma).

The detailed course scheme is given below:

Diploma -Chemical Technology							
Semester-I (ICD)							
S.N.	Sub Code	Subject Name	L	T	P	Hr s	Credit
1	AM-111	Mathematics- I	4	1	0	5	5
2	PH-111	Physics-I	4	0	2	6	5
3	CY-111	Chemistry-I	4	0	2	6	5
4	HU-111	Communication Skills-I	2	0	0	2	2
5	WS-112	Workshop Practice	0	0	4	4	2
6	ME-111	Engineering Drawing	0	0	4	4	2
7	CH-111	Pulping & Bleaching Technology	2	0	2	4	3
Total			16	1	14	31	24
Semester-II (ICD)							
S.No	Sub Code	Subject Name	L	T	P	Hr s	Credit
1	AM-121	Mathematics- II	4	1	0	5	5
2	PH-121	Physics-II	4	0	2	6	5
3	CY-121	Chemistry-II	4	0	2	6	5
4	HU-121	Communication Skills-II	1	0	2	3	2
5	CH-121	Unit Operation Lab	0	0	4	4	2
6	CH-122	Introduction of Paper Technology Lab	0	0	4	4	2
7	CS-121	Computer Fundamentals	3	0	2	5	4
Total			16	1	16	33	25
Semester-III A (ICD)							
	TP-201	Two Weeks of Practical Training during summer vacations				80	S/US
Semester-III B (ICD)							
S.N	Sub Code	Subject Name	L	T	P	Hr s	Credit
1	AM-211	Applied Mathematics	3	1	0	4	4
2	CH-211	Fluid Flow	3	1	0	4	4
3	CH-212	Pulp Washing & Chemical Recovery	3	1	4	8	6
4	CH-214	Paper Testing & Quality Control Lab	0	0	4	4	2
5	CH-215	Chemical Engg. Thermodynamics	3	2	0	5	5
6	CH-216	Mechanical Operation	3	1	0	4	4
Total			15	6	8	29	25
Semester-IV (ICD)							



S.No	Sub Code	Subject Name	L	T	P	Hrs	Credit
1	CH-221	Heat Transfer	3	2	4	9	7
2	EE-221	Fundamental of Electrical Engineering	3	0	2	5	4
3	EC-221	Fundamentals of Electronics Engineering	3	0	2	5	4
4	CH-223	Stock Preparation & Paper Making	3	2	0	5	5
5	CH-225	Paper Making Lab	0	0	4	4	2
6	MC-221	Moral values and Professional ethics	1	0	0	1	0
Total			13	4	12	29	22
<b>Semester-V A (ICD)</b>							
	TP-301	Four Weeks of Industrial Training during summer vacations				160	
<b>Semester-VB (ICD)</b>							
S.No	Sub Code	Subject Name	L	T	P	Hrs.	Credit
1	CH-311	Process Instrumentation	3	0	4	7	5
2	CH-312	Mass Transfer	3	1	0	4	4
3	CH-313	Chemical Reaction Engineering	3	2	4	9	7
4	CH-314	Industrial Stoichiometry	3	2	0	5	5
5	CH-315	Alternate Energy Sources	3	1	0	4	4
5	TP-301E	Industrial Training					S/US
Total			15	6	8	29	25
<b>Semester-VI (ICD)</b>							
S.No	Sub Code	Subject Name	L	T	P	Hrs.	Credits
1	HU-321	Entrepreneurship	2	0	0	2	2
2	MC-321	Environmental Studies	2	0	0	2	2
3	CH-321	Chemical Process Industries	3	2	0	5	5
4	CH-322	Petroleum Technology	3	1	4	8	6
5	CH-333	Process Equipment Design	1	1	4	6	4
6	CH-335	Project	0	0	4	4	2
Total			11	4	12	27	21

**Course Syllabi:** A course syllabus is an academic document communicating information about a specific course. At SLIET Longowal course syllabus may be set out by the departmental professor who supervises or controls course qualities and is recommended by the board of studies (BOS). The board of studies (BOS) have some internal members like the Head of the department, professors, an Associate professor, an Assistant professor (having a doctorate) and external member like professor from other institute, experts from industries, alums, parents etc. Finally, it shall have the approval of the Senate. In general, the departments will prepare the syllabus of each subject containing the scope of studies and instructions to be imparted, which must have the approval of the Senate. The detailed syllabus is enclosed.

**Flexibility:** The SLIET system offers two existing modes: one after completing a two-year (by taking a certificate) and another after finishing the entire course (by taking a diploma).

**Theory/Practical:** To make the timetable simple and easily implementable, the variety of course volume has been limited to only three types – (3-0-0) 3 credits, (3-1-0) 4 credits and (0-0-4) 2 credits. The total teaching duration in a week is divided into several "slots" in the timetable. Wednesday mornings has generally been free to facilitate student mentoring at departmental and institute-level meetings by mentors. Moreover, five to seven days usually have provided at the last of each semester to encourage the student to take extra classes. That leaves enough time to cover theory and laboratory subjects in a semester. Thus, typically, a student shall study a maximum of 30 theory courses and 21 laboratory or design subjects in a three-year ICD programme. Common courses taught mainly during the first year of study shall consist of: (a) the basic science subjects: Chemistry, Physics and Mathematics, (b) Mechanical/Electrical Workshop practice, (c) Computer Language including laboratory, (d) English including language laboratory, (e) Engineering Drawing (f) Basic Electrical and Electronic Engineering. The courses taught in the second year of study mainly focus on chemical engineering and paper technology like Heat Transfer, mass transfer, fluid flow, mechanical

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operation, chemical engineering thermodynamics, Chemical reaction engineering, pulp washing and chemical recovery, stock preparation and paper making etc.

### Assessment rubrics

The designed Curriculum has an effective, well-structured Choice based credit system, industry-based syllabus, flexibility, and high theory-to-practical ratio following outcome-based education	10 marks
The designed Curriculum has effectiveness, well-structured Choice based credit system, industry-based syllabus, flexibility, and a high theory to practical ratio	08 marks
The designed Curriculum has effective, well-structured Choice based credits, an industry-based syllabus, and a high theory to practical ratio	06 marks
The designed Curriculum has effective, well-structured Choice based credits and an industry-based syllabus	04 marks
The designed Curriculum is well-structured, has Choice based credits and have effectiveness	02 marks

### 2. Equivalence and Relevance of curriculum at the national level

There has been a concern about the quality of technical education in India regarding access and equity. Therefore, the government of India has appointed AICTE as the nodal agency for the planned and coordinated development of Technical Education, regulating proper maintenance of norms & standards and expansion of technical Education with Quality. The quality of technical education depends on many factors but mainly on socially and industrially relevant curriculum, good quality motivated faculty, teaching-learning process, practical industry internship and evaluation of students based on desired outcomes. Therefore, AICTE has developed a model curriculum with the help of the best experts from academia and industry, keeping in view the latest industry trends and market requirements in all significant diplomas in engineering & technology subjects and be made available to all universities/board of technical education and diploma institutions in the country.

Considering the AICTE model curriculum, the Department of chemical engineering prepared a curriculum for the ICD program with approximately a total of 142 credits and then approved by the Senate. Therefore, the curriculum is at par with the AICTE model curriculum.

### Assessment rubrics

Equivalence and relevance of designed Curriculum with model curriculum $\geq 80-100\%$	10 marks
Equivalence and relevance of designed Curriculum with model curriculum $\geq 60\%$ and $< 80\%$	08 marks
Equivalence and relevance of designed Curriculum with model curriculum $\geq 40\%$ and $< 60\%$	06 marks
Equivalence and relevance of designed Curriculum with model curriculum $\geq 20\%$ and $< 40\%$	04 marks
Equivalence and relevance of designed Curriculum with model curriculum $< 20\%$	02 marks

### 3. Formal academic load on students [Teaching, Laboratory/practical, projects (minor/major)]

Academic load is generally measured in terms of credit load and course difficulty. The success of the student is usually measured in terms of GPA. The academic burden on student per semester are given below

Semester	Theory (hr)	Tutorial (hr)	Laboratory (hr)	Projects (hr)	Credit Point
1 <sup>st</sup>	16	01	14	00	24
2 <sup>nd</sup>	16	01	16	00	25
3 <sup>rd</sup>	15	06	08	00	25
4 <sup>th</sup>	13	04	12	00	22



5 <sup>th</sup>	15	06	08	00	25
6 <sup>th</sup>	11	04	08	04	21
Total	86	22	66	04	142

**Assessment rubrics**

Academic load of designed Curriculum with model curriculum, $\geq 80$ - 100%	10 marks
Academic load of designed Curriculum with model curriculum, $\geq 60\%$ and $< 80\%$	08 marks
Academic load of designed Curriculum with model curriculum, $\geq 40\%$ and $< 60\%$	06 marks
Academic load of designed Curriculum with model curriculum, $\geq 20\%$ and $< 40\%$	04 marks
Academic load of designed Curriculum with model curriculum, $< 20\%$	02 marks

**4. Evaluation process (Continuing Evaluation and End-Term Evaluation)****Evaluation in Theory Courses**

- (a) Continuous Assessment Examinations (CAE) carrying 50% weightage.  
 (b) End Term Examination (ETE) holding 50% weightage.

- **Continuous Assessment Examination (CAE) in Theory Courses.**

- (a) There will be two minor tests (30% weight age) of their average marks. In addition, a faculty member may take a particular student's third minor under extraordinary circumstances.  
 (b) At least one MCQ-type quiz of 15 minutes and at least three assignments (10% weight age) each semester are required to check their involvement in the course.  
 (c) Faculty may give attendance marks within this 05% weight age with prior information in starting of course.

- **End Term Examination (ETE) for Theory Courses**

The structure of the question paper shall be as under: -

- (a) The question paper shall have three sections. Students will attempt five questions with equal marks, with weight age given to the numerical type problems, wherever possible.  
 (b) Section-I will have one compulsory question of short answer questions covering the whole syllabus. Section II and Section III shall contain three questions covering the entire course syllabus. The students need to attempt two questions from each section.

**Evaluation in Practical courses**

- (a) Continuous Assessment Examinations (CAE) carrying 60% weight age.  
 (b) End Term Examination (ETE) holding 40% weight age.

- **Continuous Assessment Examination (CAE) in Practical Courses**

- (a) There will be continuous assessment of the student in terms of practical records, oral viva at each lab, performance during the conduction of experiments etc. all the components have an overall 60% weightage in the total marks obtained in practical work.

- **End Term Examination (ETE) for practical Courses**

The structure of the question paper shall be as under: -

- (a) The question paper shall have the name of one already performed experiment. The students must be written all the segments of the investigation like Aim, Fundamental Theory, Flow Chart (if any), platform (software, if applicable), experimental procedure, software program (if applicable), observation table, calculation, result and discussion, precautions etc. All the components have 50% (out of 40) weightage in the total marks for external evaluation.  
 (b) The remaining 50% (out of 40) will be earned based on oral viva based on experiments performed during the final examination.

**The Overall Evaluation (Distribution of Grade):**

The award of grade has two components for theory and practical:

- (a) The 50% weight age will be given to marks obtained in view.
- (b) A 50% weight age will be given to the marks obtained in useful.

The overall grading will be done based on the following:

Grade	Range of Marks		No of Candidate
	From	To	
A+	80	100	
A	75	79	
B+	66	74	
B	61	65	
C+	51	60	
C	41	50	
D	30	40	
E	0	29	
F	-	-	
I	-	-	
S			
US			

**Assessment rubrics**

The designed Curriculum has standard and continuous teacher-based assessment grading criteria	10 marks
The designed Curriculum has standard as well as Tutorial, Quiz, Minor and End Term examination -based assessment grading criteria	08 marks
The designed Curriculum has standard and only Minor and End term examination-based assessment grading criteria	06 marks
The designed Curriculum has standard and only end term examination based assessment grading criteria	04 marks
The designed Curriculum does not have any standard assessment grading criteria	02 marks

**5. Tour/Training/Industrial visit/Internship opportunities provided during a year**

As per the course curriculum, the students have to perform two-week practical training (TP-201) after 2<sup>nd</sup> semester and four weeks of industrial activity (TP-301) after 4<sup>th</sup> semester. However, the COVID-19 pandemic situation has forced students to work from home. In such a scenario, it will not be possible for students to undergo Summer Training as usual as per past practice. So, in view of giving our students the time to complete course requirements, it is proposed to provide suitable exercises to cover the said aspect of the course. In this exercise, each student is expected to write a report in the given format for the given activity. The information should be submitted in PDF format to the designated email id in case submission does not fall in the period of institute working; otherwise, a bound report is to be submitted to the respective Faculty Coordinator (Summer Training) through the Faculty Mentor/Supervisor (Summer Training) assigned to the student.

The list of students and their respective mentor/supervisor is also available on the institute website and enclosed below for kind reference.

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Department of Chemical Engineering  
 Sant Longowal Institute of Engineering & Technology  
 In-house Practical Training of ICD 1<sup>st</sup>Year : ICD-CPT/21 batch students (6<sup>th</sup> June to 17<sup>th</sup> June 2022)  
 Faculty Coordinator (In-house Practical Training): Mr Vinod Meena

ICD 1<sup>st</sup>Year: ICD-CPT/21 batch students(list attached) got **two weeks of in-house practical training** after the end of the 2nd-semester examination from 6<sup>th</sup> June to 17<sup>th</sup> June 2022 as per the following schedule in the department.

The focus of study for ICD classes is more on practical aspects. Keeping this in mind, in-house practical training was imparted to the ICD-CPT/21 batch students so that they get exposure to the various labs and equipment used in these labs they would be using during their course. This training was of two-week duration after the end of the 2nd-semester examination from 6<sup>th</sup> June to 17<sup>th</sup> June 2022 as per the following schedule in the department.

**Objectives:** The student must be able to

1. To understand the working of the paper and paper board industry
2. To understand the scope and opportunities in the paper and paper board industry
3. To know the basic working steps of essential types of equipment in the paper industry
4. To understand and evaluate skills required by a diploma engineer – Hard skills and soft skills
5. To understand and visualize a Chemical process industry in terms of the manufacturing process, flow diagrams, materials handling, and functioning of various sections of the industry.
6. To understand the safety, environment and energy issues in the Chemical industry.
7. Any innovative product development process for handling new challenges.

S.No.	Regn.No's	Name of the Lab	Duration of training
1	2110001-211022(12 candidates)	i)Fluid &Particle Mechanics Lab ii) CRE &Thermodynamics Lab iii)Environmental Engg. Lab iv) Paper technology Lab	6 <sup>th</sup> to 9 <sup>th</sup> June 2022 10 <sup>th</sup> to 13 <sup>th</sup> June 2022 14 <sup>th</sup> to 15 <sup>th</sup> June 2022 16 <sup>th</sup> to 17 <sup>th</sup> June 2022
2	2110024-2110040 &1712440(Sub. to sem.fee deposition & Registration (11 candidates)	i)Fluid &Particle Mechanics Lab ii) CRE &Thermodynamics Lab iii)Environmental Engg. Lab iv) Paper technology Lab	10 <sup>th</sup> to 13 <sup>th</sup> June 2022 14 <sup>th</sup> to 15 <sup>th</sup> June 2022 16 <sup>th</sup> to 17 <sup>th</sup> June 2022 6 <sup>th</sup> to 9 <sup>th</sup> June 2022

**Training to 2<sup>nd</sup> Year Chemical Engineering of ICD:** The students of the second year ICD program (ICD-CPT/20) have already got in house practical training after the 1<sup>st</sup> year. However, it felt expedient that they also get exposure to the actual Industrial conditions; hence, this batch (list attached) got four weeks of in-house practical training after the end of the 4th-semester examination.

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Sr. No	Name	Reg No	Company Name	Start of Training	End of Training
1	MAYANK RAJ	2010001	INDIAN OIL CORPORATION LIMITED	22-06-22	21-07-22
2	AWANISH KUMAR RAI	2010002	INDIAN INKS AND CHEMICAL INDUSTRIES	13-06-22	12-07-22
3	MD SAYEED	2010003	BAJRANG RASAYAN	17-06-22	17-07-22
4	SHRISTI	2010005	RALSON INDIA LIMITED	09-06-22	10-07-22
5	AASTHA MISHRA	2010006	INSTANT REMEDIES PVT. LTD	01-06-22	30-06-22
6	ROHIT KUMAR	2010007	MECCI ENGINEERS PVT.LTD	07-06-22	07-07-22
7	AYUSHI KUMARI	2010008	DRMU	15-06-22	15-07-22
8	KHUSBOO KUMARI	2010010	BAJRANG RASAYAN	13-06-22	13-07-22
9	SNEHA KUMARI	2010012	ONGC	10-06-22	08-07-22
10	SHUBHAM KUMAR	2010013	SUDHA DAIRY NALANDA	15-06-22	14-07-22
11	RAJNISH KUMAR	2010018	BAJRANG RASAYAN	17-06-07	17-07-22
12	MD AAMIR HUSSAIN	2010018	BAJRANG RASAYAN	17-06-22	17-07-22
13	ADITYA RAJ	2010045	BAJRANG RASAYAN	17-06-22	17-07-22
14	LAKSHAY GULWANI	2010046	MECCI ENGINEERS PVT.LTD	07-06-22	07-07-22
15	HARE KRISHNA KUMAR	2010047	DRMU	15-06-22	15-07-22
16	VISHU KUMAR	2010048	CHEMICAL PAPER TECHNOLOGY	20-06-22	18-07-22
17	NIKITA BHARDWAJ	2010050	HANUCHEM LABORATORIES	08-06-22	08-07-22
18	AATISH KUMAR	2010052	PATNA DAIRY	04-06-22	30-06-22
19	PALAK SHARMA	2010054	NATURALIS WATER AND BEVERAGE IIP AGATALA	13-06-22	13-07-22
20	ANITA KANSAL	2010056	R.R.MILK CENTER	28-06-22	27-07-22
21	NEHAL PRIYANI	2010057	ONGC	10-06-22	10-07-22
22	APOORVA KUMARI	2010059	DIESEL LOCOMOTIVE SHED JAMALPUR	27-06-22	26-07-22
23	PURNIMA PRASHAR	2010060	BAJRANG RASAYAN	13-06-22	13-07-22
24	ARYAN YADAV	2010061	ALPHA REMEDIES	06-07-22	02-08-22
25	APRAJITA	2010062	VAISHAL PATLIPUTRA DUGDH UTPADAK SAHKARI SANGH LTD	15-06-22	15-07-22
26	YAMINI PRIYA	2010063	ONGC	10-06-22	10-07-22
27	TANISHA BHARTI	2010064	SUDHA DAIRY NALANDA	15-06-22	14-07-22
28	PRANAV SAINI	2010065	STAR PAPER MILL	17-06-22	15-07-22
29	SHAKSHI	2010066	IOCL	22-06-22	21-07-22
30	VANSHIKA	2010067	BAJRANG RASAYAN	18-06-22	18-07-22

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31	TARA RANI	2010069	BAJRANG RASAYAN	18-06-22	18-07-22
32	SATYAM KUMAR	2010070	BAJRANG RASAYAN	17-06-22	17-07-22
33	ANKITA KUMARI	2010071	BAJRANG RASAYAN	13-06-22	13-07-22
34	SHIMRAN RAJ	2010072	INSTANT REMEDIES	01-06-22	30-06-22
35	ANSHUMAN	2010073	BAJRANG RASAYAN	17-06-22	17-07-22
36	MD FARHAN ALI	2010074	TATA PIGMENT	20-06-22	22-07-22

**Assessment rubrics**

Admit students attended tour and training/Industrial visits $\geq 80$ - 100% of scheduled	07 marks
Admit students attended tour and training/Industrial visits $\geq 60$ % and $< 80$ % of scheduled	05 marks
Admit students attended tour and training/Industrial visits $\geq 40$ % and $< 60$ % of scheduled	03 marks
Admit students attended tour and training/Industrial visits $\geq 20$ % and $< 40$ % of scheduled	02 marks
Admit students attended tour and training/Industrial visits $< 20$ % of scheduled	01marks
Average Number of tours/class/ year $> 1$	03 marks
Average Number of tours and industrial visits/class/ year: 0.25-1	02 marks

**6. Effectiveness of assisted learning, a tutorial system for ICD students/Seminars (refer to Course file)**

In the academic setup, a course file is essentially a document that includes all the necessary details regarding the batch, assessment, and overall outcomes of the course. Course file generally includes information like student details, course information, assessment metrics and assignments, Tutorial course outcomes and objectives etc. The following is a general table of content of the course file maintained by each faculty member.

S. No.	Title
1	Academic Calendar
2	List of registered Students
3	Course Syllabus
4	Timetable and Evaluation Procedure
5	Lecture Plan
6	Minors-I
7	Minors-II
8	Tutorials/Assignments
9	Quiz-I
10	Quiz-II
11	Major End Exam
12	Results Copy

**Assessment rubrics**

Increased active involvement of weaker students in tutorial classes	02 marks
Improvement in students' analytical capabilities, and soft skills	02 marks
Improvement in communication skills of the students	1 mark
Effectiveness of seminar presentation by the students towards learning	1 mark
Assisted learning system for students in place	02 marks

**7. Faculty mentoring/Faculty advisor system for a class of students**

The institute has different level monitoring systems at department level and at institute level

• **At departmental level:**

A class counsellor has been appointed to mentor individual class.

Role of class counsellor: It is expected from the counsellor to ensure that the student remains disciplined and motivated in class. Moreover, counsellors provided the following for students:

- Academic Guidance:** In helping students understand their learning needs and blocks, such as equipping them with study skills, doing semi-formal assessments for Learning Disabilities and Difficulties.
- Career and Vocational Guidance:** counsellors can guide the students in choosing the right career based on suitable opportunities.
- Issues with Peers:** the class counsellor plays an important role to see how the teachers, administration and parents interacted to either mediate or exacerbate the situation as well as how it was developmentally crucial to resolve the issues.
- Psychosocial Problems:** A counsellor helps in early identification of problem behaviours and takes suitable steps to prevent the onset of psychosocial problems. In case of psychosocial problems detected after their onset, the counsellor works towards finding suitable solutions, or due to the time constraints in college, looks at referring the child to a more suitable setting if the child's home environment allows for it.

5. **Working with Parents:** To enable holistic support and to ensure that the student's home environment is secure and nurturing for her, as well as to keep the parents in the loop about the work done in counselling, and how to ensure that the results are maintained at home.
6. **Working with Teachers:** Teacher meetings are extremely crucial to ensure two basic things 1) to keep the teacher in the loop about the work being done, and how to modify his/her behaviour accordingly, as well as for inputs about the conditions of the classroom 2) help the teacher manage his own workload, by providing them with skills such as coping skills or problem-solving strategies or emotional unburdening.
7. **Working with School Administration:** working as bridge in between student's and administration.
  - **At Institute level:**
    - (i) Student-Mentor scheme: The senior student has been appointed to mentoring the junior students.
    - (ii) Tutor-Guardian scheme: A teacher has been appointed as a guardian to look forward all the academic activities as well as mentoring of four to five student of each class.
    - (iii) Warden: A hostel warden is also mentoring the students

#### Assessment rubrics

Faculty mentoring/faculty adviser are available to admitted students >91%	10 marks
Faculty mentoring/faculty adviser are available to admitted students >81 and <90%	08 marks
Faculty mentoring/faculty adviser are available to admitted students >71 and <80%	06 marks
Faculty mentoring/faculty adviser are available to admitted students >61 and <70%	04 marks
Faculty mentoring/faculty adviser are available to admitted students >51 and <60%	02 marks

#### 8. Practical activities, non-academic and totally related to a specific trade for skill development and developing expertise in a particular group of techniques.

For providing a professional platform to students of the undergraduate program of the department to learn, boost and exercise their potential through various activities, the following Professional Societies/ Students' Chapters have been established at the Department of Chemical Engineering, SLIET:

S. No.	Name of the Society/ Chapter	Year of establishment	Faculty Coordinator/ Advisor (Present)
1	Association of Chemical Technocrats, SLIET, Longowal (ACT)	1997	Dr. G K Jawa
2	Students' Chapter of IICChE (Indian Institute of Chemical Engineers)	2013	Dr. Kamlesh Kumari
3	Longowal SLIET Students' Chapter (Chemical), Institution of Engineers (India)	2014	Dr. G K Jawa
4	Innovation Chemica (A club for innovation projects)	2018	Dr. G K Jawa
5	Entrepreneurship and Incubation Cell	2019	Dr. G K Jawa
6	Communication Skills and Personality Development Cell (CSPDC)	2019	Dr. Dhiraj Sud/ Dr. G K Jawa

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Above mentioned societies/ chapters/ clubs are involved in organizing the following activities periodically on regular basis:

Society/ Club	Name of Activity	Frequency/ Dates	Remarks
Association of Chemical Technocrats, SLIET, Longowal (ACT)	'Quintessence' – A Wall Magazine	Weekly/ Fortnightly	For Students/Faculty/ staff of Dept. of Chemical Engg., SLIET
	Technical Quizzes (Written and Oral)	Weekly (Monday)	For Students of Dept. of Chemical Engg., SLIET
	Reading Journals and Presentation	Weekly (Monday)	-do-
	Freshers' Welcome Function	Annual (Sept/Oct)	-do-
	Farewell Function (for outgoing batch)	Annual (May)	-do-
	Swachh Bharat Abhiyaan (Cleanliness Drives)	Monthly	In the department, hostels, institute
	Departmental Events during TECHFEST (Mega technical annual event of institute)	Annual	National level students participation
Students' Chapter of IICHE (Indian Institute of Chemical Engineers)	Technical Quizzes, Essay Writing Contests, Debates etc.	Quarterly	For students of Deptt.
	Scholarships to Students (2-3 students)	Annual	For students of deptt.
Longowal SLIET Students' Chapter (Chemical), Institution of Engineers (India)	Learn and Share (Technical presentations, quizzes, discussions etc.)	Weekly (Wednesday)	Students of Department
	Lectures by Faculty/ Experts	Monthly (Every First Wednesday of Month)	
	Engineers' Day Celebration	Annual (15 <sup>th</sup> Sept.)	For all students of SLIET
	National Technology Day Celebration	Annual (16 <sup>th</sup> May)	-do-
	Science Week Celebration	Annual (February)	-do-
	Technical Quizzes, Essay Writing Contests, Debates, Poster contests, Paper presentations etc.	On various occasions like Energy Conservation Day, Swachh Bharat Abhiyaan, Jal Shakti Abhiyaan etc.	-do-
	IEIChemBubble (A Wall Magazine)	Weekly/ Fortnightly	For students of Dept. of Chemical Engg., SLIET
Innovation Chemical (A club for innovation projects)	Innovative Ideas sharing (Presentations)	Weekly (Tuesday)	For students of Dept. of Chemical Engg., SLIET
	Project Work	Regular	For students of Dept. of Chemical Engg., SLIET
	Imagine to Innovate (Poster Presentation Contest)	Half Yearly	For students of Dept. of Chemical Engg., SLIET
	Projects Exhibition and Presentations	Annual	For students of Dept. of Chemical Engg., SLIET
Entrepreneurship and Incubation	Expert/ Invited Talks	Monthly	For students of Dept. of Chemical Engg., SLIET



Cell	Entrepreneurship Workshops	Quarterly	For students of Dept. of Chemical Engg., SLIET
	Learn n Share	Weekly (Thursday)	For student members
	Visit to Industry/ business	Monthly	For student members
	Weekend Internship	Weekends	For student members
Communication Skills and Personality Development Cell (CSPDC)	Workshops on communication skills / soft skills	Regular	For students of institute

Note: The above-mentioned activities are conducted periodically on regular basis as mentioned except during exams/ vacations.

#### Industry Tours of students:

Industry Trip of students of Chemical Engineering to Shiva Proteins Pvt. Ltd., Tohana on 21.04.2022

#### Expert Talks:

Name of Expert/ Speaker, Designation	Organisation/ Institute	Date	Field of Talk
Dr. Chirodeep Bakli, Assistant Professor	School of Energy Science and Engineering, IIT Kharagpur	October 23, 2021	The Duality of Contact Angle and Wettability- Towards Smart Surfaces
Prof. Sumesh P Thampi	IIT Madras	November 6, 2021	Hydrodynamics of active particles in micro-channels
Prof. Yunus Cengel	Professor Emeritus at the University of Nevada, Reno, USA	November 26, 2021	Ramifications of the Innovations in Material Science on Energy Systems
Prof. Eray Aydil,	Department of Chemical and Biomolecular Engineering, New York University	December 3, 2021	Quantum Cutting with rare-Earth Doped Halide Perovskites
Ms Prachi Alawadhi Mishra	Indian Revenue Service	Sept 11, 2021	Career in Civil Services
Mr. Himanshu	MS (Research) IIT Madras		Gateways to higher Studies after B.Tech. in Chemical Engineering

#### Publication of technical magazines, newsletters etc.

Name of Magazine/ Newsletter	Frequency	Faculty Coordinator/ Editor
ANSHUMAT (Newsletter of SLIET)	Quarterly	Dr Sanjiv Garg
'Quintessence' (A Wall Magazine of ACT, SLIET)	Weekly/ Fortnightly	Dr G K Jawa
IEI Chem Bubble (A Wall Magazine of IEI Chemical Students' Chapter, SLIET)	Weekly/ Fortnightly	Dr G K Jawa
SRIJAN (Annual Magazine of SLIET)	Annual	Dr. Sanjiv Garg

#### Assessment rubrics

Students attended any practical, non-academic activity related to skill development >80%	10 marks
Students attended any practical, non-academic activity related to skill development $\geq 60\%$ and <80%	08 marks
Students attended any practical, non-academic activity related to skill development $\geq 40\%$ and <60%	06 marks

Students attended any practical, non-academic activity related to skill development $\geq 20\%$ and $< 40\%$	04 marks
Students attended any practical, non-academic activity related to skill development $< 20\%$	02 marks

### 9. Linkage of the ICD program to outcome-based vocational education (industry linkage)

It aims to provide diversified educational opportunities so as to enhance individual employability reduce the mismatch between demand and supply of skilled manpower and provide an alternative for those pursuing higher education.

#### Assessment rubrics

Hands-on training load (Practical + Project + industrial training)/ total ICD load, $\geq 75\%$	10 marks
Hands-on training load (Practical+ Project +industrial training)/ total ICD load, $\geq 50\%$ and $< 75\%$	08 marks
Hands-on training load (Practical+ Project +industrial training)/ total ICD load, $\geq 50\%$ and $< 60\%$	06 marks
Hands-on training load (Practical+ Project +industrial training)/ total ICD load, $\geq 40\%$ and $< 50\%$	04 marks
Hands-on training load (Practical+ Project +industrial training)/ total ICD load, $< 40\%$	02 marks

### 10. Availability of workshop-type lab/laboratory for providing hands-on training to the student for skill development

Skills development in students is essential to face the challenges of everyday life. There is a dramatic change in the world due to the unprecedented use of technology during the past few decades. These transformations impact all spheres of our life including education, economy, career, etc. To cope with the increasing pace and changes, students should learn the necessary skills to make sure of their desired careers. They must be able to deal with competition in the job market. Only those who have Technical Skills and soft skills will stand out from the crowd. Technical Skills in a Career will generate High-Income while Soft Skills Provide Greater Career Prospects. Keeping view of the aforementioned facts, the following facilities have been developed for providing hands-on training to the student for skill development.

**Central Workshop:** The Central Workshop was established at Sant Longowal Institute of Engineering & Technology (Deemed to be University), Longowal to impart practical training to the students of all the branches. The various shops of the Workshop are fully equipped and provide centralized training to Certificate and Diploma students. It also caters for the need of the project work of the students.

#### Different types of workshops

- |                     |                 |                     |                     |
|---------------------|-----------------|---------------------|---------------------|
| a) Machine Shop     | b) Tool Room    | c) Arc Welding Shop | d) Sheet Metal Shop |
| e) Gas Welding Shop | f) Pattern Shop | g) Carpentry Shop   | h) Fitting Shop     |
| i) Foundry Shop     | j) Forging Shop |                     |                     |

**Departmental Laboratory:** The departmental laboratory has been developed for hands out training of students. The following laboratories are well equipped with different equipment.

- |                            |   |                           |
|----------------------------|---|---------------------------|
| a) Fluid & Particle Lab    | b) Heat and Mass Transfer Lab           | c) Polymer Processing Lab |
| d) Polymer Testing Lab     | e) Pulping and bleaching technology lab | f) Paper technology lab   |
| g) Energy Technology lab   | h) Chemical reaction engineering lab    | i) Computational Lab      |
| j) Chemical Technology Lab | l) Process Control and dynamic lab      |                           |

#### Assessment rubrics

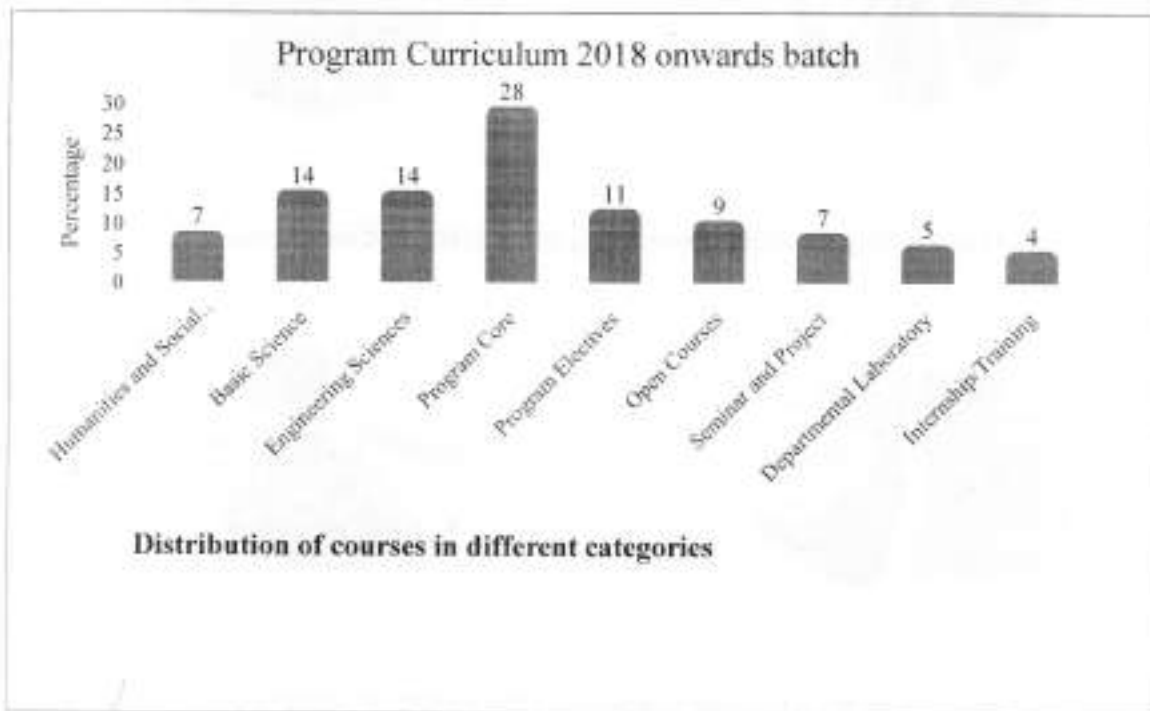
The workshop/lab can provide hands-on training for skill development $> 80\%$	10 marks
The workshop/lab can provide hands-on training for skill development $\geq 60\%$ and $< 80\%$	08 marks
The workshop/lab can provide hands-on training for skill development $\geq 40\%$ and $< 60\%$	06 marks
The workshop/lab can provide hands-on training for skill development $\geq 20\%$ and $< 40\%$	04 marks
The workshop/lab can provide hands-on training for skill development $< 20\%$	02 marks

**A.2 UG program**

**1. Curriculum (Structure, Course Syllabi, Flexibility)**

The curriculum for the UG program is designed by the members of the Board of Studies (BOS) constituted at the department level as per the structure/guidelines issued by AICTE/UGC time to time which are duly approved by the Senate of the institute. Periodical revision to the curriculum that is taken up by the BOS is based upon the inputs received from different stakeholders like students, the faculty members teaching that subject as well as from faculties doing research work in that area, experts from industries who contribute via making new and industrially relevant topics in the field. Necessary changes to be incorporated in the curriculum are discussed relevantly and revision is approved by the Senate.

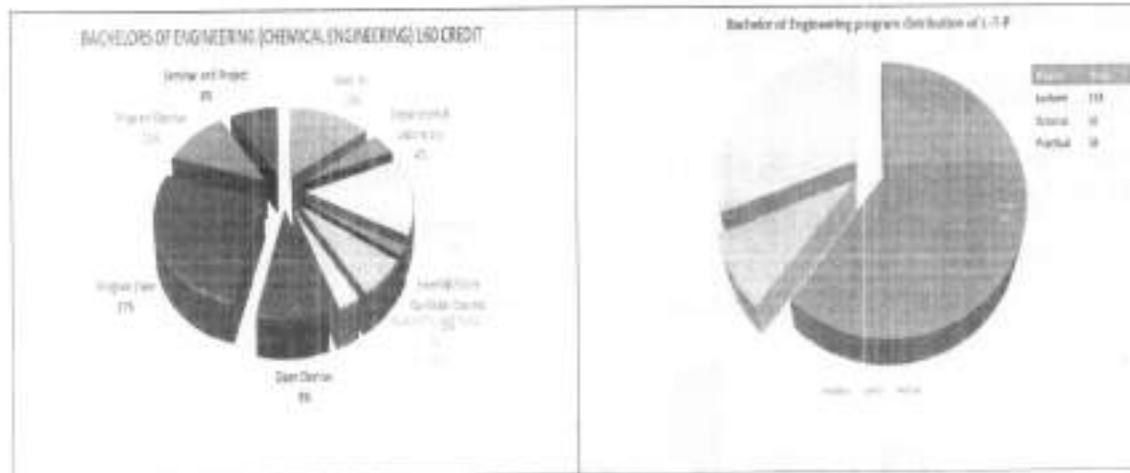
Revision of curricula: 30.03.2016, 01-02.06.2016, 15.12.2016 (internal), 23.11.2017 (internal), 24.05.2018 & July 02, 2021.



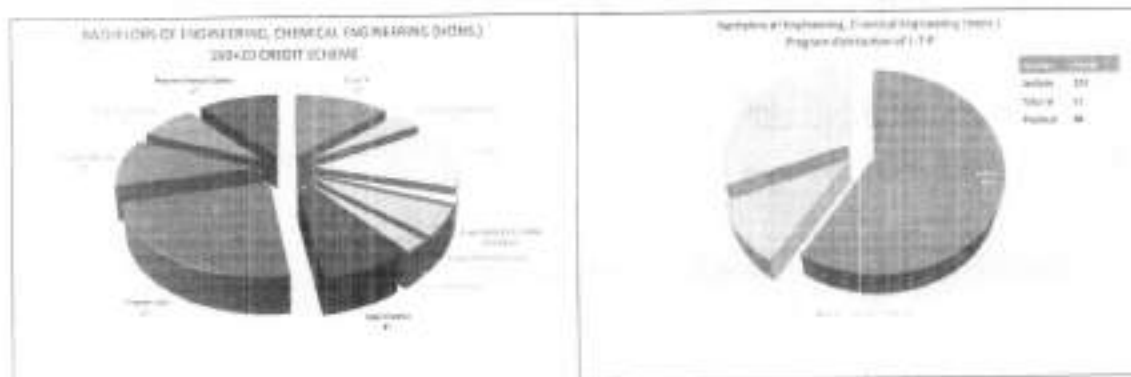
Revision of curricula: Date of BOS: July 02, 2021

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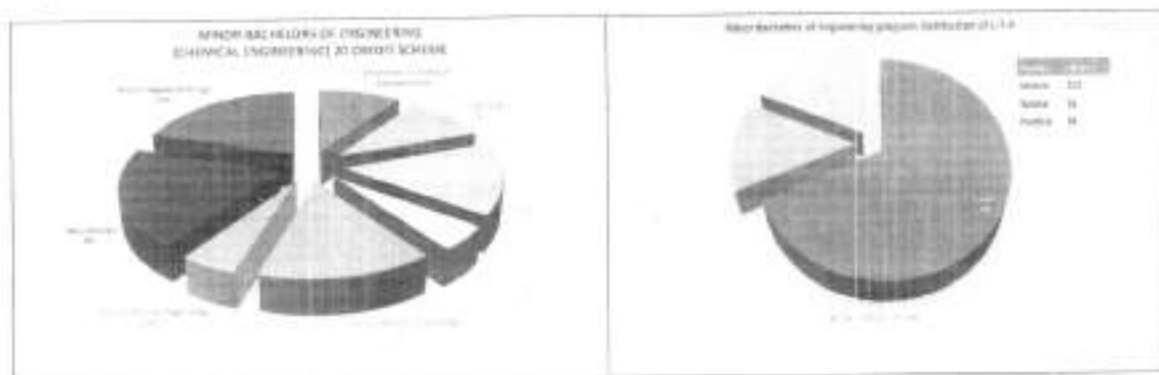
a) Bachelor of Engineering (Chemical Engineering) 160 Credit scheme



b) Bachelor of Engineering, Chemical Engineering (Hons.) 160+ 20 Credit scheme



c) Minor Bachelor of Engineering Degree (Chemical Engineering) 20 Credit scheme



**Assessment rubrics**

The designed Curriculum has effective, well-structured, Choice based credit system, industry-based syllabus, flexibility, and high theory to practical ratio following outcome based education	10 marks
The designed Curriculum have effectiveness, well-structured, Choice based credit system, industry-based syllabus, flexibility, and high theory to practical ratio	08 marks
The designed Curriculum have effectiveness, well-structured, Choice based credits, industry-based syllabus, and high theory to practical ratio	06 marks
The designed Curriculum have effectiveness, well-structured, Choice based credits and industry-based syllabus	04 marks
The designed Curriculum well-structured, Choice based credits and have effectiveness	02 marks

**2. Status of study material developed by faculty for students:**

The quality of teaching-learning outcome is closely related to its quality. Usually, the learning materials used are only textbooks with conventional lecture-centred learning. So, it is necessary to design and develop the teaching and learning material. Developing study materials provide opportunities for teachers to explore and learn new information in the context of training students. It also helps teachers to develop their professional skills.

**Assessment rubrics**

Study material developed by the faculty for subjects >80% and<100%	10 marks
Study material developed by the faculty for subjects >60% and<80%	08 marks
Study material developed by the faculty for subjects >40% and<60%	06 marks
Study material developed by the faculty for subjects >20% and<40%	04 marks
Study material developed by the faculty for subjects >5% and<20%	02 marks

**3. Relevance of contents of courses taught to the students and scope of improvement (revision of syllabus, the addition of new experiments)**

The syllabus fosters breadth and depth of understanding in the subject area. The revision of the curriculum/syllabus according to the needs, to eliminate unnecessary units, & contents and to introduce the latest and update content, new knowledge & practices is necessarily required.

**Revision of curricula:**

Date of BOS: Dec. 2016, June 02, 2018, July 02, 2021

**Assessment rubrics**

Adequate relevant contents of courses of program specific taught to students	10 marks
Adequate relevant contents of courses of other allied subjects taught to students	08 marks
Revision of syllabus within two-three years	06 marks
Revision of syllabus within four years	04 marks
Addition of new experiments	02 marks

**4. Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects (minor/major)]**

Academic load is measured in terms of credit load and course difficulty.

**Assessment rubrics**

Adequacy of formal academic load on students (teaching/Laboratory/practical)	10 marks
Adequacy of formal academic load on students (minor/major projects)	08 marks
Adequacy of formal academic load on students (minor/major projects)	06 marks

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Flexibility to extend course duration in limited, exceptional circumstances	04 marks
Flexibility for opting the academic load for the odd semester/ even Semester/ Summer term/ Distance Session	02 marks

### 5. Modern teaching methods in practice other than the conventional methods

#### E-Assisted Learning

- (i) **Availability of Library Resources**
- (ii) **Multi-Media Assisted Teaching**

Course materials, PPT, videos, library sources and multi-media assisted teaching help to explain the concepts in a lucid manner to the students. It creates a learning environment more interactive and allows the integration of various technologies to improve the learning experience.

#### Assessment rubrics

Course Materials, videos and PPT developed by the faculty	10 marks
Course Materials PPT developed by the faculty	08 marks
Library sources made available to students from other sources related to the course	06 marks
Multimedia assisted teaching >65% and<100%	04 marks
Multimedia assisted teaching >15% and< 65%	02 marks

### 6. Evaluation Process (Continuing Evaluation, and End-Term Evaluation)

- (i) **Theory and tutorial**
- (ii) **Practical (case studies)**

(i) Program curriculum designed for this program is checked for its adequate compliance by examining the students, via continuous assessment. Routine assessment is carried out for tutorials, class assignments and laboratory work assigned to the students. The performance of a student is evaluated by seminars, industrial training viva-voce, quizzes, assignments, mid-semester, and end-semester exams. Assessment for minor project work is carried out in the 7<sup>th</sup> semester followed by the major project assessment in the 8<sup>th</sup> semesters. Finally, a Comprehensive and General Proficiency evaluation (Viva-Voce) is carried out in the 8<sup>th</sup> semester.

Question papers are set in accordance to meet largely the Cos, POs and PSOs of the program.

Due weightage in terms of marks as well as course content of the subjects is given to each of exams.

The quality of these exams is ensured by designing these exams in a way where the students are assessed for their subjective as well as objective learning. Short and long-answer type questions are set to evaluate the grasping ability of students. Assignments are formulated by the concerned teacher to strengthen their domain knowledge and application to complex engineering problems. The nature of the assignments drives the students to use advanced techniques including software tools for prediction and modelling and referring to additional sources of information. These are evaluated and discussed with the students to iron out their deficiencies.

#### Assessment rubrics

Question papers and Project work are aligned with the COs, POs and PSOs of the program	10 marks
Routine assessment is carried out for tutorials, class assignments (> 6 and <= 10) and laboratory work assigned (>8 and <= 10)	08 marks
Routine assessment is carried out for tutorials, class assignments (> 4 and <= 6) and laboratory work assigned (> 6 and <= 8)	06 marks
Routine assessment is carried out for tutorials, class assignments (> 2 and <= 4) and laboratory work assigned (> 4 and <= 6)	04 marks
Routine assessment is carried out for tutorials, class assignments (<= 2) and laboratory work assigned (<=4)	02 marks

**7. Faculty-Student Interaction (Whether any slot is fixed for the students to interact with a teacher, after classes/labs)**

This faculty-students interaction helps to understand the problems faced by the students during the teaching-learning process and insight to further strengthen it. The slot is fixed for the students to interact with a teacher, after classes/labs for

- Class counsellor-student meeting
- Course counsellor-student meeting
- Training coordinator-student meeting

**Assessment rubrics**

Average Faculty-Student interaction per week after classes/ Labs >10	10 marks
Average Faculty-Student interaction per week after classes/labs >8 and <=10	08 marks
Average Faculty-Student interaction per week after classes/labs >6 and <=8	06 marks
Average Faculty-Student interaction per week after classes/labs >4 and <=6	04 marks
Average Faculty-Student interaction per week after classes/labs >2 and <=4	02 marks

**8. Tour/Training/Industrial visits/Internship opportunities**

Departments have been consistently working for providing industry tours/internship / Summer training to the students for getting practical exposure and to build up professionalism amongst students. The curriculum of the undergraduate program comprises In-house training and Industry/ Summer Training on a mandatory basis. Besides the appointment of Training Coordinators and Placement Coordinators by the T&P department of the institute, the department has also constituted a training placement and Industry Institute interaction cell. The department arranges the educational trips to the relevant industries to enable students to understand real-time problems and to get practical exposure and to motivate students to analyse and bridge the gap between institute and industry. Students are encouraged to go for internships at various industries/ organisations during their semester breaks. Training coordinators, class counsellors and tutor guardians of the students motivate and guide the students in arranging the industry internship. Alumni members of the department also provide great help in the process.

Students' Summer Training is arranged by the Department of Training and Placement along with training Coordinators of the department through developing interaction with the industries. Institute has built up a good rapport with various reputed industries. Students are closely guided and monitored by training coordinators before and during the summer training. Evaluation of the students going through training is made by the industry as well as at the institute. Students are required to prepare and submit a 'Daily Diary' and 'Industry Training Report' and a presentation/ viva-voce is conducted by the department evaluation committee. The in-house training is also provided to the students at the institute after the first year to give them an engineering feel which gives them the motivation to become ready for the engineering journey. Also, the department of Chemical Engineering continually strives to impart practical education based on industrial visits

**Sant Longowal Institute of Engineering & Technology, Longowal  
In-house Summer Training**

**Part – 1 (July 25-29, 2022) (ONLINE MODE)  
(GCT 1<sup>st</sup> Year Students)**

**OVERVIEW OF CHEMICAL ENGINEERING AND THE CURRICULUM OF THE DEGREE  
PROGRAM**

**(To be taken up by concerned Faculty Members)**

**Background:** This training is of two-week duration, in which one week is online mode and the second week is offline mode. This hybrid mechanism was evolved so that students can remain for one week more at their home as the vacations after the completion of the second semester were curtailed to make up for the time lost during the Covid period and the students can learn relevant and meaningful things which will be useful to them during this graduation course. During the online mode, all the faculty members provided exposure to the students regarding the subjects which will be taught to them during the next three years laying emphasis on the importance of these subjects for making them successful Chemical Engineer. During the second week, which was conducted in offline mode, the students got exposure to all the labs in the department and the experiments which they would be doing later on. The modules of this training are described as under

**Training - PART 1**

**Faculty Coordinator (Summer Training) – GCT21  
Dr.S.M.Ahuja and Dr Gulshan Kumar Jawa**

**Assistance and Monitoring: Mr Ravinder Sharma**

**Mode of Interaction/ delivery: Online through Google meet**

**Timing: (A): 09.00 – 11.00 am, (B) 11.00 am to 1.00 pm and (C): 3.00 – 5.00 pm**

**Note:** During the session, an introduction/overview of the contents of specified subjects would be covered such that the students should become familiar with the subject and its importance.

Date of Interaction	Name of faculty	Subjects to be Covered
25.07.2022 (A)/(B)/(C)	Dr S.M.Ahuja/ Dr. Gulshan Kumar Jawa	Overview of Chemical Engineering/ Introductory Tour of the department NBA attributes for Chemical Engineers and POs/PEOs etc.
26.07.2022 (A) 9 am – 11 am	Dr. Pushpa Jha	Agro-Residue Utilization Renewable Energy Sources Project Work & Seminar
26.07.2022 (B) 11am – 1pm	Dr Kamlesh Kumari	Fluid Mechanics Polymer Materials Polymer Technology Heat Transfer Fuel Cells
26.07.2022 (C) 3pm – 5pm	Dr H R Ghatak	Chemical Reaction Engineering – I & II Bio-refineries Electrochemical Engineering Environmental Studies
27.07.2022 (A) 9am – 11am	Dr S M Ahuja	Fluid & Particle Mechanics Energy Audit & Management Environment Impact Assessment Fluidization Engineering



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27.07.2022 (B) 11am – 1pm	Dr Avinash Thakur	Process Dynamics and Control Bio-Chemical Engineering Modeling & Simulation Novel Separation Technology
27.07.2022 (C) 1pm – 3pm	Dr. Gulshan Kumar Jawa	Chemical Engineering Thermodynamics Industrial Pollution Control Hazardous Waste Management
28.07.2022 (A) 9am – 11am	Dr A S K Sinha	Stock Preparation & Paper Making Pulping & Bleaching Technology Chemical Recovery Process in Pulp & Paper industry
28.07.2022 (B) 11am – 1pm	Mr V K Meena	Process Equipment Design Process Instrumentation & control Petroleum Refining and Petrochemicals
28.07.2022 (C) 3pm – 5pm	Mrs. Subita Bhagat	Chemical Process Industries Combustion Technology Rubber Technology Fertilizer Technology
29. .2022 (A) 9am – 11am	Dr Nikhil Prakash	Optimization of Chemical Processes Polymer Composites Computational Fluid Dynamics Transport Phenomena
29.07.2022 (B) 11pm – 1pm	Dr Amit Rai	Material and Energy Balance Mass Transfer –I & II Plant Utilities & Industrial safety Process Integration Molecular Simulation
29.07.2022 (C) 3pm – 5pm	Dr. S.M.Ahuja/ Dr. Gulshan Kumar Jawa	Discussions and feedback.

**Training - PART 2**

**(B.E. CHEMICAL 1st Year Students - GCT2021)  
(AUG 16-23, 2022)**

**Faculty Coordinator (In-house Summer Training) -- GCT 21:  
Prof. S.M. Ahuja & Dr Gulshan Kumar Jawa  
Assistance and Monitoring: Mr Ravinder Sharma**

The laboratory tours will be conducted in detail by the concerned staff/ Technician considering the following points:

- We are sharing a lab. Manuals and discussions, lists of experiments of the practical subjects covered in the concerned lab, lists of equipment in the lab, and other relevant information.
- Introduction of laboratory and all equipment in the lab, along with experiments to be conducted (possible demonstration). Safety and other relevant issues in labs are to be discussed.

**Schedule:**

S.No.	Date	Name of Lab	Concerned Technician/ Faculty
1	16.8.2022 (09.00 - 13.00)	Particle & Fluid Mechanics Lab	Dr Pawan Kumar
2	16.8.2022 (14.00 - 17.00)	Paper Technology lab	Mr Ramnik Aggarwal
3	17.8.2022 (09.00 - 13.00)	Chemical Reaction Engineering and Thermodynamics lab	Mr Gagandeep Goyal
4	17.8.2022 (14.00 - 17.00)	Research Lab-II/ Environmental Engg. Lab	Mr. Rajesh Kamboj
5	18.8.2022 (09.00 - 13.00)	Heat & Mass Transfer Lab	Mr. Rajesh Kamboj
6	18.8.2022 (14.00 - 17.00)	Process Dynamics & Control Lab	Dr Pawan Kumar
7	22.8.2022 (09.00 - 13.00)	Chemical Technology Lab/ Energy Technology Lab/ Polymer Technology Lab	Mrs. Seema/Dr Pawan Kumar
8	22.8.2022 (14.00 - 17.00)	Computational Lab	Mr Ravinder Sharma
9	23.8.2022 (09.00 - 17.00)	Technical Presentations	Prof. S M Ahuja/Dr Gulshan Kumar Jawa

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**Industrial Training**  
**(B.E. CHEMICAL 2nd Year Students – GCT 2020)**  
**Faculty Coordinator– GCT 20: Dr Nikhil Prakash**

A two-week industrial training was provided to the students of second-year Chemical Engineering. These students got exposure from various industries as per the list enclosed.

**Objectives:** The student must be able to

1. To observe the structure and functioning of the Chemical industry.
2. To understand the scope and opportunities in Chemical engineering.
3. To analyze the NBA attributes for an engineering graduate.
4. To understand and evaluate skills required by a chemical engineer – Hard skills and soft skills.
5. To understand and visualize a chemical process industry in terms of the manufacturing process, flow diagrams, materials handling, and functioning of various industry sections.
6. To introduce the safety, environmental and energy issues in the chemical industry.

**Details of Students on Training:**

Name	Registration Number	Name of Industry	Duration
Nitish Kumar Mishra	2130363	Bajrang rasayan, Muzaffarpur	13-06-22 To 27-06-22
Rishabh Kant	2130010	Jai Shree Lakshmi Polymers	16-06-22 to 29-06-22
Arati Gupta	2040023	Bharat Plasto Chem Pvt Ltd	11-06-22 to 11-07-22
Saurav Kumar Sinha	2130368	Bajrang Rasayan Pvt Ltd	17-06-22 to 01-07-22
Ayushi	2130361	Ordnance factory Nalanda	13-06-22 to 27-06-22
Rohan Kalra	2130012	National fertilizer limited, Nangal	08-06-22 to 06-07-22
Shanki Kumar Rawat	2040027	Synmac chemicals PVT Ltd	16-06-22 to 01-07-22
Anjali Pandey	2130371	Noble Lifesciences Private Limited	13-06-22 to 27-06-22
Harsh Raj	2130354	Bajrang Rasayan exporters Pvt. Ltd	13-06-22 to 27-06-22

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Vipul Chauhan	2130378	Jai Shree Lakshmi Polymers	16-06-22 to 29-06-22
Aryan Raj	2130355	Mahabir Bajrang Agro Chemicals Pvt. Ltd.	13-06-22 to 27-06-22
Bipin Kumar Yadav	2040014	NFL Nagal Unit, Nangal Punjab-140126	10-06-22 to 09-06-22
Vikash Kumar	2130359	Bajrang Rasayan	17-06-22 to 01-07-22
Kumari Pallavi	2040005	BhartPlasto Chem Pvt Ltd	11-06-22 to 11-07-22
Tanu Shakya	2040007	BhartPlasto Chem Private Limited	11-06-22 to 11-07-22
Mohd Almas Husain	2040001	chemicals technologies	06-07-22 to 22-07-22
Shailenderkumar	2040031	Wegrowpetchem industry Pvt	20-06-22 to 03-07-22
Ujjwal Kumar Tiwary	2130375	Sail, Tisco Steel Plant, Burnpur	20-06-22 to 03-07-22
Satyam kushwaha	2040028	Synmac chemicals Pvt ltd	16-06-22 to 01-07-22
Rahul Kumar Jha	2130015	Mahavir Bajrang Agro Chemical Pvt. Ltd., Bela Muzaffarpur, Bihar	13-06-22 To 27-06-22
Abhishek Shakya	2040006	Synmac Chemicals Private Limited, Kanpur, Uttar Pradesh	16-06-22 to 01-07-22
Arihant Mani	2130351	Mahabir Bajrang Agro Chemical Pvt.Ltd.	13-06-22 to 27-06-22
Ankit Kumar	2130374	Mahabir Bajrang Agro Chemical PVT. Ltd.	13-06-22 to 27-06-22
Nikhil Raj	2130360	Mahabir Bajrang Agro Chemicals Pvt.Ltd	13-06-22 to 27-06-22

**Industrial Training**  
**(B.E. CHEMICAL 3rd Year Students – GCT 2019)**  
**Faculty Coordinator– GCT 19: DrA.S.K. Sinha**

**(Duration of Training: June 4 - July 31, 2022)**

A four-week industrial training was provided to the students of 3rd-year Chemical Engineering. These students got exposure from various industries as per the list enclosed.

**Objectives:** The student must be able to

1. To observe the general structure and functioning of a chemical industry
2. To understand the scope and opportunities in chemical engineering
3. To analyze the NBA attributes for an engineering graduate
4. To understand and evaluate skills required by a chemical engineer – Hard skills and soft skills
5. To select a chemical industry for study and to assess its status and scope at the world level
6. To understand and visualize a chemical process industry in terms of history, manufacturing process, flow diagrams, materials handling, and functioning of various industry sections.
7. To visualize the plant utilities and materials handling in the chemical industry
8. To describe the safety, environment and energy issues in a chemical industry
9. To appreciate the Innovation Research & Development in that industry sector
10. To analyze the career opportunities in the selected industry sector.
11. To visualize the role of the Chemical Engineer and position in the chemical industry after graduating.

Details of 3<sup>rd</sup>-Year Students on Training:

Name	Registration Number	Company Name	Start of Training	End Of Training
Piyush Gupta	1940095	National Fertilizer Limited, Naya Nangal, Punjab	13-06-2022	09-07-2022
Nitish Bhardwaj	1940096	National Fertilizers Limited, Naya Nangal, Punjab	13-06-2022	09-07-2022
Harshita Tiwari	1940097	National Fertilizer Limited, Naya Nangal, Punjab	13-06-2022	09-07-2022
Prashant Kumar	1940098	Mahabir Bajrang Agro Chemicals Pvt. Ltd	04-06-2022	01-07-2022
Ambika Jaiswal	1940101	Rashtriyaspat Nigam Limited Steel plant Visakhapatnam	06-06-2022	02-07-2022
Pramod Kumar	1940102	Oil and Natural Gas Corporation limited, Dehradun	24-06-2022	10-08-2022
Sujata Verma	1940105	National Fertilizer Limited, Naya Nangal, Punjab	13-06-2022	09-07-2022
Nikhil Kumar	1940106	Oil and Natural Gas Corporation Bombay	16-06-2022	16-06-2022
Pradumnkumar	1940107	Oil and natural gas corporation	24-06-2022	07-08-2022
Sanket Biswas	1940108	University of Waterloo, Canada	08-06-2022	16-08-2022
Saurabh goyal	1940109	National Fertilizer Limited, Naya Nangal, Punjab	13-06-2022	09-07-2022
UtsahBaghel	1940110	Bhilai Steel Plant, SAIL	20-06-2022	16-07-2022
Sushant Kumar	1940111	Premier Alcobev Private Limited	13-06-2022	17-07-2022
Ashish Share	1940112	National Fertilizer Limited, Naya Nangal, Punjab	13-06-2022	09-09-2022
Shailesh Kumar Mishra	1940113	National Thermal Power Corporation Limited, Kahalgaoon	01-07-2022	01-08-2022
Laxmi Kumari	1940114	RINL steel plant vizag	6-13-2022	09-07-2022
Safraj Akhter Hussain	2030001	Indian Oil Corporation Limited, Digboi	6-13-2022	7-12-2022
Mayank Kumar	2030002	Flexituff Ventures International Ltd	10-06-2022	10-07-2022
Lakhan Kumar pandit	2030003	National Fertilizer Limited, Naya Nangal, Punjab	14-06-2022	13-07-2022
Ujjwal Kumar	2030004	Indian institute of technology Roper	04-06-2022	12-08-2022
Zulqar Nain	2030005	National Fertilizers Limited, Nangal, Punjab	13-06-2022	12-07-2022
Gautam Kumar	2030010	National Fertilizer Limited, Naya Nangal, Punjab	14-06-2022	14-07-2022
TapanKhanikar	2030011	Terra Green Technologies pvt. Ltd and IICHe A	25-09-2022	30-10-2022
Abhinav Kumar	2030012	National aluminium corporation limited (Nalco)	13-06-2022	12-07-2022
Manish Kumar	2030013	Delhi jal board	01-07-2022	28-07-2022
Rishabh ujenwal	2030014	Delhi Jal Board	05-07-2022	30-07-2022
Praveen Kumar	2030015	National Fertilizer Limited, Naya Nangal, Punjab	14-06-2022	12-07-2022
Harsh Maurya	2030016	Indian oil R&D	16-06-2022	16-08-2022
Tushar Kumar	2030017	Indogulf pharmaceuticals Muzaffarnagar, UP	07-06-2022	07-07-2022

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Komal Rawat	2030019	Century pulp and paper	21-06-2022	21-07-2022
Vikas Kumar	2030020	National Fertilizer Limited, Naya Nangal, Punjab	14-06-2022	12-07-2022
SubhamMalty	2030021	Hadiya Refinery	13-06-2022	11-07-2022
Yuvraj Kumar	2030351	ONGC	06-06-2022	08-07-2022
Sapna Rani	2030352	INDIAN FARMER FERTILIZER COOPERATIVE LIMITED PHULPUR, PRAYAGRAJ, UP	08-06-2022	09-07-2022
Pallavi Kumari	2030353	Indian Farmers Fertilizer Cooperative Limited	08-06-2022	09-07-2022
Prafull Mishra	2030354	Indian Oil Corporation Limited, Mathura Refinery	01-07-2022	30-07-2022
Lovepreet Singh	2030355	Ind-swift laboratories	10-06-2022	10-07-2022
Ram Krishna Kumar	2030356	Indian Oil Corporation and Limited	15-06-2022	14-07-2022
Shubham Kumar	2030357	IOCL BARAUNI	15-06-2022	14-07-2022
MRINMOY DHAR	2030358	National Fertilizer Limited, Naya Nangal, Punjab	10-06-2022	08-07-2022
Archana Bharti	2030359	Larsen and Toubro Hydro Carbon	13-06-2022	30-07-2022
Sweta	2030360	Gail India (Lmtd.)	08-06-2022	07-07-2022
Abhishek Kumar	2030361	Mahabir Bajrang Agro Chemical Pvt. Ltd.	04-06-2022	01-07-2022
Bhushan Kumar	2030362	Indian Oil Corporation Limited	15-06-2022	14-07-2022
Atulya Kumar	2030363	Indian Oil Corporation Ltd Barauni Refinery	15-06-2022	14-07-2022
Gurjinder Singh	2030364	Guru Gobind Singh Refinery-HMEL, Bathinda	27-06-2022	26-07-2022
Amit Kumar	2030365	Indian Oil Corporation Ltd, Barauni Refinery, Begusarai, Bihar	15-06-2022	14-07-2022
Sonali Kumari	2030366	Gail India (Lmtd.)	08-06-2022	07-07-2022
Aniket Singh	2030367	Oil and Natural Gas Corporation Limited	06-06-2022	08-07-2022
Shristikumari	2030368	National Fertilizer Limited, Naya Nangal, Punjab	13-06-2022	12-07-2022
Mohit Verma	2030369	Guru Gobind Singh Refinery HMEL, Bathinda	27-06-2022	26-07-2022
Mudita Sinha	2030370	Indian Acrylics Limited	08-06-2022	07-07-2022
Harshita Saxena	2030371	National Fertilizer Limited, Naya Nangal, Punjab	14-06-2022	12-07-2022
Virat Ashish Kumar Sinha	2030372	Indian Oil Corporation Limited	15-06-2022	14-07-2022
Sanketkumar	2030374	National Fertilizer Limited, Naya Nangal, Punjab	10-06-2022	08-07-2022
Prateek Kumar	2030375	Mahabir Bajrang Agro Chemical Pvt. Ltd.	04-06-2022	01-07-2022
Gurcharan Singh	2030376	Guru Gobind Singh Refinery-HMEL, Bathinda	27-06-2022	26-07-2022
Diksha Kumari	2030377	IND Swift Laboratories Ltd	10-06-2022	09-07-2022
Priti Kumari	2030379	Aasma foods and Beverages PVT ltd	06-06-2022	08-07-2022
Amrendra Yadav	2030380	Mahabir Bajrang Agro Chemical PVT.LTD	04-06-2022	01-07-2022
Aastha Bhushan	2030381	Indian oil corporation limited, Barauni, Bihar	14-06-2022	13-07-2022
Parampreet Singh	2030382	Guru Gobind Singh refinery-HMEL Bathinda	27-06-2022	26-07-2022

S.No.	Name of the Industry	Date of Visit
1	Shiva Proteins Pvt. Ltd., Tohana	21.04.2022

**Assessment rubrics**

Average Number of tours and industrial visits/class/year > 2 and internships	10 marks
Average Number of tours and industrial visits/class/year > 1 to <=2 and internships	08 marks
Average Number of tours and industrial visits/class/year > 1 to <=2	06 marks
Average Number of tours and industrial visits/class/year >0.25 <=1 and internships	04 marks
Average Number of tours and industrial visits/class/year >0.25 to <=1	02 marks



9. (a) Effectiveness of Assisted Learning in Tutorial classes/seminars for Students  
(b) Faculty Mentoring/Faculty Advisor System for Students/Class of Students.

The assignment is one of the assessment components in each subject towards the effectiveness of assisted learning in tutorial classes. Assignment questions include real-time and complex analytical problems. The questions are framed in such a way as to encourage the self-learning habit of students. It also ensures that the students refer to different sources to answer the questions. Assignments are planned in such a way that they enhance the critical thinking skills of the students and promote the self-learning process. Moreover, besides classroom and laboratory learning, various events like seminars/expert lectures for students are organized to improve the teaching-learning process. Further, students must also present a topic of their choice related to the syllabi in front of other students and faculty. The students may use PowerPoint presentation tools as an aid. This helps students to improve their presentation and public speaking skills. The tutor guardian and the department's class counsellor system help motivate the students to face real-life challenges, improve their problem-solving capabilities, leadership abilities, and teamwork, and create awareness about professional ethics and critical reasoning abilities.

**Assessment rubrics**

Increased active involvement of weaker students in tutorial classes	10 marks
Improvement in students' analytical capabilities and soft skills	08 marks
Improvement in communication skills of the students	06 marks
Effectiveness of seminar presentation by the students towards learning	04 marks
Faculty mentoring/Faculty advisory system for students in place	02 marks

10. Placement %age/higher studies options (last three years)

A/Y	Total no. of students	Placed through campus	Overall placed	Percentage
2019-20	43	17	23	53.49
2020-21	55	09	11	20.00
2021-22	62	19	27	43.5

**Assessment rubrics**

Average of Placement %age/higher studies >80%	10 marks
Average of Placement %age/higher studies ≥60% and <80%	08 marks
Average of Placement %age/higher studies ≥40% and <60%	06 marks
Average of Placement %age/higher studies ≥20% and <40%	04 marks
Average of Placement %age/higher studies <20%	02 marks

Department of Chemical Engineering Academic Audit: 2021-22

A.3 PG program

1. Curriculum (Structure, Course Syllabi, Flexibility):

Structure of M Tech (Chemical Engineering) program:

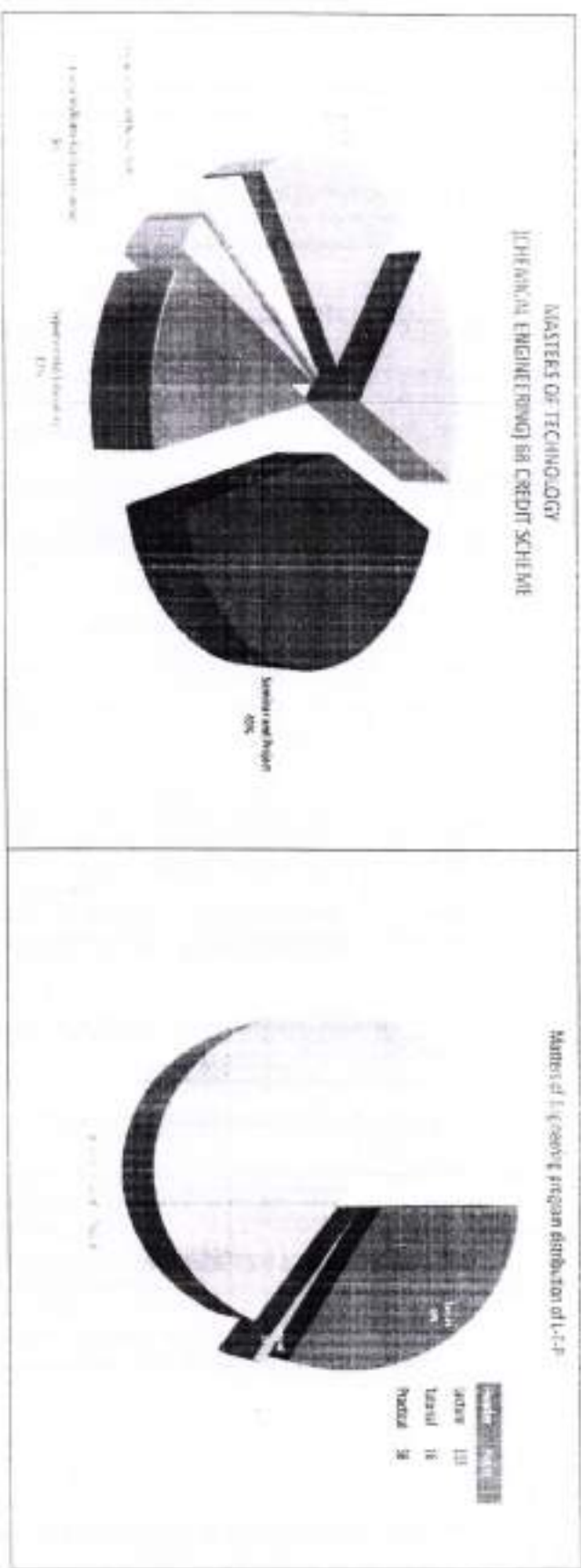
Course Components	Curriculum Content (% of the total number of credits of the program)	Total number of contact hours	Total number of credits
Program core	26	23	18
Program Electives	28	23	19
Open electives	4.4	3	3
Research Methodology and IPR	2.9	2	2
Audit Courses	NC	4	0
Dissertation	38	52	26
Total number of Credits	100	107	68

LIST OF THE STUDENTS ADMITTED IN 21-22

Total Number of students admitted: 01

S.No.	Trade	Regn. No	Name of Student
1	PGCE	2150252	RIDIKA DEVI

BOS date: July 02, 2021.



**Assessment rubrics**

The designed Curriculum have effectiveness, well-structured Choice based credit system, industry-based syllabus, flexibility, and a high theory-to-practical ratio following outcome-based education	10 marks
The designed Curriculum has effectiveness, well-structured Choice based credit system, industry-based syllabus, flexibility, and a high theory to practical ratio	08 marks
The designed Curriculum has effective, well-structured Choice based credits, an industry-based syllabus, and a high theory to practical ratio	06 marks
The designed Curriculum has effective, well-structured Choice based credits and an industry-based syllabus	04 marks
The designed Curriculum is well-structured, has Choice based credits and have effectiveness	02 marks

**2. Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]:**

Course Components	Curriculum Content (% of the total number of credits of the program)	Total number of contact hours	Total number of credits
Program core	26	23	18
Program Electives	28	23	19
Open electives	4.4	3	3
Research Methodology and IPR	2.9	2	2
Audit Courses	NC	4	0
Dissertation	38	52	26
Total number of Credits	100	107	68

**Assessment rubrics**

8-hours formal Academic Load on Students (Laboratory/Practical, Projects)	10 marks
10-hours formal Academic Load on Students ( Laboratory/Practical, Projects)	08 marks
6-hour formal Academic Load on Students (Teaching, Laboratory/Practical, Projects)	06 marks
8-hours formal Academic Load on Students (Teaching, Laboratory/Practical, Projects)	04 marks
10-hours formal Academic Load on Students (Teaching, Laboratory/Practical, Projects)	02 marks

**3. Evaluation Process (Continuing Evaluation and End-Term Evaluation)**

The program curriculum designed for this program is checked for adequate compliance by examining the students via continuous assessment. Routine assessment is carried out for tutorials, class assignments and laboratory work assigned to the students. Seminars, industrial training viva-voce, quiz, assignments, mid semester, and end-semester exams evaluate a student's performance. Assessment for Research project work is carried out in the 3<sup>rd</sup> and 4<sup>th</sup> semesters. Finally, after the internal evaluation of the research work, the research thesis is sent to the external examiner through the academic section to evaluate the research project. Question papers are set to essentially meet the Cos, POs and PSOs of the program. Due weightage in terms of marks and course content of the subjects is given to each exam. The quality of these exams is ensured by designing them in a way where the students are assessed for their subjective and objective learning. Short and long-answer questions are set

to evaluate the grasping ability of students. The concerned teacher formulates assignments to strengthen their domain knowledge and application to complex engineering problems. The nature of the assignments drives the students to use advanced techniques, including software tools for prediction and modelling and referring to additional sources of information. These are evaluated and discussed with the students to iron out their deficiencies.

#### Assessment rubrics

Question papers, Laboratory work, and Project work, are aligned with the COs, POs and PSOs of the program	10 marks
Routine assessment is carried out for tutorials, class assignments (> 6 and <= 10) and laboratory work assigned (> 8 and <= 10)	08 marks
Routine assessment is carried out for tutorials, class assignments (> 4 and <= 6) and laboratory work assigned (> 6 and <= 8)	06 marks
Routine assessment is carried out for tutorials, class assignments (> 2 and <= 4) and laboratory work assigned (> 4 and <= 6)	04 marks
Routine assessment is carried out for tutorials, class assignments (<= 2) and laboratory work assigned (<=4)	02 marks

#### 4. Relevance of contents of courses taught to the students and scope of improvement:

The syllabus fosters breadth and depth of understanding in the subject area. However, to revise the curriculum/syllabus according to the needs, eliminate unnecessary units, & contents and introduce the latest and updated content, new knowledge & practices are necessarily required. Therefore, revision has been done in the meeting of the Board of studies held on 02<sup>nd</sup> July 2021.

#### Assessment rubrics

Adequate, relevant content of courses of the program specifically taught to students	10 marks
Adequate, relevant content of courses of other allied subjects taught to students	08 marks
Revision of syllabus within two-three years	06 marks
Revision of syllabus within four years	04 marks
Addition of new experiments	02 marks

#### 5. Modern teaching methods in practice other than the conventional methods

##### E-Assisted Learning

##### (i) Availability of Library Resources and Major Search Engines (like Scopus, Web of Science)

**Journals:** ASME Journals Online, Economic & Political Weekly.

Elsevier Science Direct, IEEE /IET Electronic Library (IEL), Springer Link 1700 collection and Nature Journal

**Databases:** Biological & Agricultural Index Plus, FSTA: Food Science and Technology Abstracts, Institute for Studies in Industrial Development (ISID) Database.

JDate Plus (JCCC) JSTOR, Library & Information Science Source Library, Information Science and Technology Abstracts, Web of Science Lease Access

VIDWAN: Expert Database & National Researcher's Network

Detail of e-resources available at <http://library.sliet.ac.in/e-resources/>

##### (ii) Multimedia Assisted Teaching

Course materials, PPTs, videos, library sources and multimedia-assisted teaching help to explain the concepts lucidly to the students. In addition, it creates a learning environment more interactive. Finally, it allows the integration of various technologies to improve the learning experience.

**Assessment rubrics**

Course Materials, videos and PPTs developed by the faculty	10 marks
Course Materials PPT developed by the faculty	08 marks
Library sources and Major search engines made available to students and Multimedia assisted teaching	06 marks
Multimedia assisted teaching >65% and <100%	04 marks
Multimedia assisted teaching >25% and < 65%	02 marks

**6. Technical Societies / Colloquium for Students**

**i. Departmental Society**

The Department of Chemical Engineering has the Society of Chemical Technocrats. Various competitions like poster making, quiz, debate, food craft and product development were organized under different themes.

**ii. Student Chapter(s) of Professional Societies**

For overall grooming, the students are encouraged to participate in a greater number of Academic co-curricular and Extra co-curricular activities. Also, the students are continuously motivated to go for industrial, institutional or internship during vacations.

**Assessment rubrics**

Technical Societies / Colloquium for Students and Student Chapter(s) of Professional Societies- 100 % participation of sanctioned strength	10 marks
Technical Societies / Colloquium for Students: 80 % participation of sanctioned strength	08 marks
Technical Societies / Colloquium for Students: 60 % participation of sanctioned strength	06 marks
Student Chapter(s) of Professional Societies: 60 % participation of sanctioned strength	04 marks
Student Chapter(s) of Professional Societies: 40 % participation of sanctioned strength	02 marks

**7. Tour/Training/Industrial visits/Internship opportunities.**

Departments have been consistently providing industry tours/internship / summer training to the students for practical exposure and to build up professionalism amongst students. Besides the appointment of Training and Placement Coordinators by the T&P department of the institute, the department has also constituted a training placement and Industry Institute interaction cell. The department arranges educational trips to the relevant industries to enable students to understand real-time problems, get practical exposure, and motivate students to analyse and bridge the gap between institute and industry. Students are encouraged to intern at various industries/ organisations during their semester breaks. Training coordinators and class counsellors of the students motivate and guide the students in arranging the industry internship. Alumni members of the department also provide great help in the process. As a result, Institute has built a good rapport with various reputed industries. Also, the department of Chemical Engineering continually strives to impart practical education based on industrial visits.

**Assessment rubrics**

Average Number of tours and industrial visits/class/year > 2 and internships	10 marks
Average Number of tours and industrial visits/class/year >1 to <=2 and internships	08 marks
Average Number of tours and industrial visits/class/year >1 to <=2	06 marks
Average Number of tours and industrial visits/class/year >0.25 <=1 and internships	04 marks
	02 marks

8. **Collaboration with other departments (within the institute)**

Lab facilities of the Department of Food Engineering and Central facility are being utilized for imparting technical know-how and hands-on practice on the latest state of the Art equipment for the M.Tech student.

**Assessment rubrics**

Collaboration with other departments for 5 events in a year	10 marks
Collaboration with other departments for 4 events in a year	08 marks
Collaboration with other departments for 3 events in a year	06 marks
Collaboration with other departments for 2 events in a year	04 marks
Collaboration with other departments for 1 event in a year	02 marks

**Events:** Expert lectures, Project/ Thesis supervision/ subject teaching etc.

9. **Faculty mentoring/Faculty advisor system for a class of students.**

This faculty-student interaction helps to understand the problems faced by the students during the teaching-learning process and insight to strengthen it further. The slot is fixed for the students to interact with a teacher after classes/labs for the Class counsellor-student meeting and Course counsellor-student meeting.

**Assessment rubrics**

Faculty mentoring/faculty advisers are available to admitted students >91%	10 marks
Faculty mentoring/faculty advisers are available to admitted students >81 and <90%	08 marks
Faculty mentoring/faculty advisers are available to admitted students >71 and <80%	06 marks
Faculty mentoring/faculty advisers are available to admitted students >61 and <70%	04 marks
Faculty mentoring/faculty advisers are available to admitted students >51 and <60%	02 marks

10. **Monitoring and continuous evaluation of the project work assigned to the students (a mechanism)**

All the faculty members are eligible to guide the M.Tech students. Students are distributed among the faculty members in the first week of the third semester. In the middle of the 3<sup>rd</sup> and 4<sup>th</sup> Semesters, students give a synopsis seminar related to the Project problems in front of the departmental research committee. After completing the project, the student presents their work to the internally constituted committee. On the committee's recommendations, students submit three copies of the thesis and the softcopy. The guide gives the list of external experts for the final viva voce. After receiving the external report, students appear in the final presentation before the external examiner. The student is awarded the degree once an external expert gives the recommendations for the award of the M.Tech degree.

S.No.	Roll No.	Name	Dissertation Part I (PCCH-911)	Project Supervisor
1	2050252	Ridika Devi	Waste management and Recycling	Prof. Pushpa Jha

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**Assessment rubrics**

Number of continuous evaluations of project work > 3	10 marks
Number of continuous evaluations of project work = 3	08 marks
Number of continuous evaluations of project work = 2	06 marks
Number of continuous evaluations of project work = 1	04 marks
Number of continuous evaluations of project work = 0	02 marks



**A.4 Doctoral (PhD) Programmes****1. Intake of PhD Students****2021-22:**

1. Devanand Bambole: Date of Enrolment, 01.10.2021 (Part-time)

**Assessment rubrics**

The number of students admitted is 80-100% of the number allocated in the seat matrix in all categories	10 marks
The number of students admitted is 60-79% of the number allocated in the seat matrix in all categories	08 marks
The number of students admitted is 40-59% of the number allocated in the seat matrix in all categories	06 marks
The number of students admitted is 20-39% of the number allocated in the seat matrix in all categories	04 marks
The number of students admitted is <20% of the number allocated in the seat matrix in all categories	02 marks

**2. Admission Process**

Conducted twice in the year according to the Ordinances & Rules, and Regulations for the Doctor of Philosophy (PhD) degree of the Institute

**Assessment rubrics**

All guidelines are fulfilled, and students are GATE/ NET qualified and Interviewed.	10 marks
All guidelines are fulfilled, and students are SET-qualified and Interviewed	08 marks
All guidelines fulfilled, and students are SET qualified	06 marks
Minor deviations from guidelines are fulfilled, and students are SET qualified	04 marks
Major deviations from guidelines are fulfilled, and students are SET qualified	02 marks

**3. Pre-Ph.D Courses and Evaluation Process**

There are no Pre-Ph.D Courses. However, after enrolment, the candidate has to register for prescribed coursework and clear the course with satisfactory grades. In addition, the candidate has to present two seminars in the area of research.

**2021-22:**

1. Devanand Bambole: Completed coursework on "Advanced polymer composite technology- (CH-10002)."

**Assessment rubrics**

All admitted candidates complete coursework and seminar in the stipulated time	10 marks
80% of admitted candidates complete coursework and seminar in the stipulated time	08 marks
60% of admitted candidates complete coursework and seminar in the stipulated time	06 marks

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40% of admitted candidates complete coursework and seminar in the stipulated time	04 marks
20% of admitted candidates complete coursework and seminar in the stipulated time	02 marks

#### 4. Breadth and Depth of Knowledge of Students

Candidates are admitted through a well-laid-out admission process based on their GATE scores or SET scores. In addition, the admission is based on a presentation by the candidate and a technical interview by the DRC.

##### Assessment rubrics

90-100% score in qualifying examination and interview	10 marks
80-89% score in qualifying examination and interview	08 marks
70-79% score in qualifying examination and interview	06 marks
60-69% score in qualifying examination and interview	04 marks
50-59% score in qualifying examination and interview	02 marks

#### 5. Seminar/ Presentations and Technical Communication

##### 2021-22:

- |                       |                                    |
|-----------------------|------------------------------------|
| 1. Subita Bhagat      | Presented a Pre-submission seminar |
| 2. Vinod Kumar Meena  | Presented a Pre-submission seminar |
| 3. Kaleem Ahmad       | Presented a Pre-submission seminar |
| 4. Akash Sood         | Presented a Pre-submission seminar |
| 5. Purika             | Presented a Pre-submission seminar |
| 6. Pratyush Upadhayay | Presented a Pre-submission seminar |
| 7. Gaurav Singh       | Presented a Pre-submission seminar |

##### Assessment rubrics

All students present progress seminars and submit a report within the stipulated time	10 marks
80% of students present progress seminars and submit a report within the stipulated time	08 marks
60% of students present progress seminars and submit a report within the stipulated time	06 marks
40% of students present progress seminars and submit a report within the stipulated time	04 marks
20% of students present progress seminars and submit a report within the stipulated time	02 marks

#### 6. Research Facilities available in the Department

Research Lab-I: HPLC, TGA-FTIR, TOC Analyzer, Potentiostat Galvanostat, Rotary vacuum evaporator

Research Lab-II: UV-VIS spectrophotometer, Rotary Evaporator, BOD incubator and COD determination system, Particle size analyser, and metal ion detector

Research Lab-III: Super Critical Fluid Extraction System, Fermenter, Millipore Vacuum Filtration, Incubator Shaker, Centrifuge, Conductivity Meter, UV-VIS Spectrophotometer, VLE Apparatus

Research lab-IV: Biodiesel Plant, Industrial Cyclone Separator.

##### Assessment rubrics

Comparable with the institute of national eminence	10 marks
Comparable with the institute of regional eminence	08 marks

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Comparable with peer departments within Institute	06 marks
Somewhat less than peer departments within Institute	04 marks
Significantly less than peer departments within Institute	02 marks

**7. Average No. of Research Students/Faculty:**

**2021-22:**

No. of faculty: 9 (Eligible for supervision)

No. of Research Students: 8

Average No. of Research Students/Faculty: 0.89

**Assessment rubrics**

The average number of Research Students/Faculty 8	10 marks
The average number of Research Students/Faculty 6	8 marks
The average number of Research Students/Faculty 4	6 marks
The average number of Research Students/Faculty 3	4 marks
Average Number of Research Students/Faculty 2	2 marks

**8. Average No. of Research Papers of Ph. D Students (Indexed Journals)**

**2021-2022:**

A thesis submitted: NIL

## Research Papers:

B. Research Publications					
A. Web of Science Indexed Journals					
Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN Number
Degradation and mineralization of metformin by electro-oxidation on Ti/DSA (Ta <sub>2</sub> O <sub>5</sub> -Ir <sub>2</sub> O <sub>3</sub> ) anode and combined electro-oxidation and electro-coagulation on stainless steel (SS) anode	Meena V.K. and Ghatak H.R.	Chemical Engineering	Iranian Journal of Chemistry and Chemical Engineering	2022	1021-9986
Electrochemical advanced oxidation of Lamotrigine at Ti/DSA (Ta <sub>2</sub> O <sub>5</sub> -Ir <sub>2</sub> O <sub>3</sub> ) and stainless steel anodes	Meena V.K. and Ghatak H.R.	Chemical Engineering	Journal of Electrochemical Science and Technology	2022	2093-8551
Optimal production of vanillin and 4-hydroxybenzaldehyde from rice straw hydrolysis residue (RSHR) over TiO <sub>2</sub> /UV and ZnO/UV system	Ahmad, K. Ghatak H.R., and Ahuja, S.M.	Chemical Engineering	Journal of the Indian Chemical Society	2022	0019-4522
Recent advancements in ionic liquid-based carbon capture technologies	Akash Sood, Avinash Thakur and Sandeep Mohan Ahuja	Chemical Engineering	Chemical Engineering Communications	2021	0098-6445
A Novel Patent Assessment Criterion for Carbon Dioxide Capture Technologies	Akash Sood, Avinash Thakur and Sandeep Mohan Ahuja	Chemical Engineering	Bioscience Biotechnology Research Communications	2021	0974-8455

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Study on Effect of Ionic Liquids on Static Stability of Green Emulsion Liquid Membrane	Purtika, Avinash Thakur, and Gulshan Kumar Jawa	Chemical Engineering	Colloids and Surfaces A: Physicochemical and Engineering Aspects	2022	9277757
<b>B. Scopus indexed Journals</b>					
<b>Title of paper</b>	<b>Name of the author/s</b>	<b>Department of the teacher</b>	<b>Name of journal</b>	<b>Year of publication</b>	<b>ISSN Number</b>
Electrochemical Mineralization Kinetics of Metformin	Meena, V.K., and Ghatak H.R.	Chemical Engineering	Asian Journal of Chemistry	2022	0970-7077
Comparative study of Metallocene catalyst propylene polymerization with different iteration rates	Subita Bhagat, Nikhil Prakash	Chemical Engineering	YMER	2021	0044-0477
Effect of temperature and pressure on the stability of metallocene catalyst with methyl aluminoxane	Subita Bhagat, Nikhil Prakash	Chemical Engineering	YMER	2022	0044-0477
Review on Recent Technological Advances in Carbon Dioxide Capture Sequestration/Storage	Akash Sood, Sandeep Mohan Ahuja, Avinash Thakur	Chemical Engineering	Journal of Tianjin University Science and Technology	2022	0493-2137
Recent Ameliorations in Membrane-Based Carbon Capture Technologies	Akash Sood, Avinash Thakur and Sandeep Mohan Ahuja	Chemical Engineering	Materials Today: Proceedings	2022	<u>2214-7853</u>

## Department of Chemical Engineering Academic Audit: 2021-22

Average No. of Research Papers of Ph. D Students =  $12/7 = 1.71$  per student

### Assessment rubrics

An average number of Research Papers for PhD. Students $\geq 5$	10 marks
The average number of Research Papers of Ph. D Students 4	8 marks
The average number of Research Papers of Ph. D Students 3	6 marks
The average number of Research Papers of Ph. D Students 2	4 marks
The average number of Research Papers of Ph. D Students 1	2 marks

### 9. Average Duration to Complete PhD (years)

Dr Sandeep Singh: 05 Years  
 Dr Sandeep Kumar Tripathi: 03 Years  
 Dr Anil Kumar: 05 Years  
 Average duration to complete Ph.D. = 4.3 *years*

### Assessment rubrics

Average duration to complete Ph. D. 3 years	10 marks
Average duration to complete Ph. D. 4 years	8 marks
Average duration to complete Ph. D. 5 years	6 marks
Average duration to complete Ph. D. 6 years	4 marks
Average duration to complete Ph. D. 7 years	2 marks

### 10. Participation of Research Scholars in Conferences/Workshops

#### Conferences:

- Akash Sood, Avinash Thakur, Sandeep Mohan Ahuja, Recent ameliorations in membrane-based carbon capture technologies, 2nd International Conference on Advances in Materials, Mechanics, Mechatronics and Manufacturing (April 09-10, 2022).
- Vinod Meena, 2<sup>nd</sup> International Conference on Industrial and Manufacturing Systems, 11-13 November 2021, Jointly organised by PEC, Chandigarh and NIT Jalandhar.
- Vinod Meena, International conference on desalination and water treatment : Recent Technological Advancement, Challenges and Opportunities., March 26-27, 2022, organised by MBM, University, Jodhpur.
- Purika, Chemical, Bio & Environmental Engineering (CHEMBION-2021), NIT, Jalandhar, Punjab, August 20-22, 2021.
- Purika, International Conference on Biotechnology for Resource Efficiency, Energy, Environment, Chemical and Health, Organised by CSIR-IIP, Deharadun, December 1-4, 2021.
- Purika, 6<sup>th</sup> International Conference on Sustainable Energy and Environmental Challenges, December 27-29, 2021, NIT Jalandhar.
- Kaleem Ahmad, 2<sup>nd</sup> International Conference on Chemical, Bio & Environmental Engineering (CHEMBIOEN-2021), NIT, Jalandhar, Punjab, August 20-22, 2021.

#### Workshops:

- Akash Sood, NOA Webinar: How to Measure your Carbon Footprint to Become Carbon Neutral, 6th May 2022.
- Gaurav Singh, Analytical Techniques in the Realm of Molecules & Materials, July 26-31, 2021, Organised by the Department of Chemistry, SLIET, Longowal.
- Gaurav Singh, Writing quality research papers in the area of Engineering & Sciences and Publishing in high impact international Conferences and Journals, Organised by CCSU, Meerut.
- Gaurav Singh, DST sponsored Short Term Course on System Design, Optimization and Control, March 11-15, 2022, Organised by the Department of Chemical Engineering, Malaviya National Institute of Technology, Jaipur.
- Gaurav Singh, FDP on "Writing quality research papers in engineering & sciences and publishing in high impact international Conferences and Journals" Jan 10-15, 2022 at SCRIPT, Chaudhary Charan Singh University, Meerut.

- Pratyush Upadhyaya, "Writing quality research papers in engineering & sciences and publishing in high-impact international Conferences and Journals" Jan 10-15, 2022, at SCRIPT, Chaudhary Charan Singh University, Meerut.
- Pratyush Upadhyaya, "Waste management" Organised by NITTTR, Chandigarh, 2021
- Pratyush Upadhyaya, "Operational research: An introduction", Organised by NITTTR, Chandigarh, 2021.
- Pratyush Upadhyaya, "Developing Eco-system for Innovation and Entrepreneurship", Organised by SCIC, CCSU, Meerut, 2021.

**Assessment rubrics**

The average number of participations $\geq 9$	10 marks
The average number of participations $\geq 7$ and $< 9$	8 marks
Average number of participations $\geq 5$ and $< 7$	6 marks
Average number of participations $\geq 3$ and $< 5$	4 marks
The average number of participations $\geq 1$ and $< 3$	2 marks

## B Research

### 1. Research Ambience in the Department

As mandated by the Department's Mission, the Department of Chemical Engineering is actively engaged in research activities. We have nine faculty members competent to guide doctoral students. At present, nine research scholars are pursuing their doctoral research. In addition, the Department has well-equipped laboratories and adequate computational facilities to augment the research work. All this culminates in high-impact research output in publications and patents.

#### Assessment rubrics

a) 4 marks for faculty qualification	
b) 3 marks for research facilities/ infrastructure	
c) 3 marks for several research scholars	
80-100% faculty with PhD	4 marks
60-80% faculty with PhD	3 marks
40-60% faculty with PhD	2 marks
20-40% faculty with PhD	1 mark
Excellent research facilities/ research infrastructure	3 marks
Adequate research facilities/ research infrastructure	2 marks
Inadequate research facilities/ research infrastructure	1 marks
A large number of research scholars	3 marks
Adequate number of research scholars	2 marks
Less number of research scholars	1 marks

### 2. Research Awareness among Doctoral Students

As part of initial grooming, every research scholar completes a course on Research Methodology. In addition, they met a course related to the proposed research area. With this initiation, the doctoral student delivers two seminars on the broad scope of research. This activity provides the student with the opportunity to have an understanding of the recent developments in the proposed research area. Finally, the student further elaborates on this, engages in an extensive literature review, and comes out with the research proposal.

#### Assessment rubrics

Research awareness among doctoral students by 01 conferences per year	10 marks
Research awareness among doctoral students by 01 workshops per year	8 marks
Research awareness among doctoral students by 02 expert lectures per year	6 marks
Research awareness among doctoral students by 01 expert lecture per year	4 marks
Research awareness among doctoral students by offering courses	2 Marks

### 3. Thrust areas of research in the department

- Industrial pollution control
- Wastewater treatment
- Solid waste management
- Lignin valorisation
- Energy conservation and audit
- Biochemical engineering
- Paper technology
- Polymer technology
- Process modelling and simulation
-



**Assessment rubrics**

a) 4 marks for national relevance	
b) 3 marks for regional or local relevance	
80-100% thrust areas nationally relevant	4 Marks
60-80% of thrust areas are nationally relevant	3 Marks
40-60% thrust areas nationally relevant	2 Marks
20-40% thrust areas nationally relevant	1 Marks
70-100% thrust areas regionally relevant	3 Marks
40-70% thrust areas regionally relevant	2 Marks
10-40% thrust areas regionally relevant	1 Marks
70-100% thrust areas locally relevant	3 Marks
40-70% of thrust areas are locally relevant	2 Marks
10-40% thrust areas locally relevant	1 Marks

**4. Quality of Research**

**2021-2022:**

Department strives to uphold the highest standards of research as elaborated with the following parameters.

Total No. of publications: WoS 13, Scopus 10, Indexed journals 1, Proceedings 2, Book/book chapter 6

Total No. of publications per faculty: WoS: 1.18, Scopus: 0.90, Indexed journals: 0.09

Average Impact factor:  $27/11 = 2.45$

Total citations: WoS: 286, Scopus 423, Google Scholar: 709

Total citations per faculty: WoS 28.0, Scopus 38.45, Google Scholar 64.5

Research Publications						
4.	A. Web of Science indexed Journals					
	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN Number
	Evolved gases and unified kinetic model for low-temperature thermal decomposition of rice straw hydrolysis residue for possible value addition	Ghatak H.R.	Chemical Engineering	Periodica Polytechnica Chemical Engineering	2022	Online ISSN: 1587-3765 Print ISSN: 0324-5853
	Degradation and mineralization of metformin by electro-oxidation on Ti/DSA (Ta <sub>2</sub> O <sub>5</sub> -Ir <sub>2</sub> O <sub>3</sub> ) anode and combined electro-oxidation and electro-coagulation on stainless steel (SS) anode	Meena V.K., and Ghatak H.R.	Chemical Engineering	Iranian Journal of Chemistry and Chemical Engineering	2022	1021-9986
	Electrochemical advanced oxidation of Lamotrigine at Ti/DSA (Ta <sub>2</sub> O <sub>5</sub> -Ir <sub>2</sub> O <sub>3</sub> ) and stainless steel anodes	Meena V.K., and Ghatak H.R.	Chemical Engineering	Journal of Electrochemical Science and Technology	2022	2093-8551
	Optimal production of vanillin and 4-hydroxybenzaldehyde from rice straw hydrolysis residue (RSHR) over TiO <sub>2</sub> /UV and ZnO/UV system	Ahmad, K., Ghatak H.R., and Ahuja, S.M.	Chemical Engineering	Journal of the Indian Chemical Society	2022	0019-4522
	Formic Acid Pulping Process of Rice Straw for Manufacturing of Cellulosic Fibers with Silica	Sinha, Akhouri Sanjay Kumar	Chemical Engineering	TAPPI	2021	7341415

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Extraction and evaluation of structural and physicochemical properties of dietary fibre concentrate from mango peels by using a green approach	Brahmeet Kaur, Parmjit Singh Panesar Avinash Thakur	Chemical Engineering	Biomass Conversion and Biorefinery	2021	2190-6823
Recent advancements in ionic liquid-based carbon capture technologies	Akash Sood, Avinash Thakur and Sandeep Mohan Ahuja	Chemical Engineering	Chemical Engineering Communications	2021	0098-6445
A Novel Patent Assessment Criterion for Carbon Dioxide Capture Technologies	Akash Sood, Avinash Thakur and Sandeep Mohan Ahuja	Chemical Engineering	Bioscience Biotechnology Research Communications	2021	0974-6455
Study on Effect of Ionic Liquids on Static Stability of Green Emulsion Liquid Membrane	Purtika, Avinash Thakur, and Gulshan Kumar Jawa	Chemical Engineering	Colloids and Surfaces A: Physicochemical and Engineering Aspects	2022	9277757
Supercritical fluid extraction of essential oils from Citrus reticulata peels. Optimization and characterization studies	Shreya Rajput, Samandeep Kaur, Parmjit S. Panesar and Avinash Thakur	Chemical Engineering	Biomass Conversion and Biorefinery	2022	2190-6823
Mathematical modelling and simulation of fluidized bed gasifier: Application to Indian coal	Amit Rai, Bikash Mohanty, Shradha Agarwal	Chemical Engineering	Iranian Journal of Chemistry and Chemical Engineering	2022	1021-9986
Synthesis of Biopolymer Chitosan-based Hydrogels with and without Crosslinker for Removal of Industrial Dye Procion Blue HERD: A Comparative Study	Bhullar N, Garg M, Kumari K, Sud D	Chemical Engineering	Indian Chemical Engineer	2022	Print ISSN 0019-4506

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Amphiphilic chitosan/acrylic acid/thiourea based semi-interpenetrating hydrogel. Solvothermal synthesis and evaluation for controlled release of an organophosphate pesticide. Triazophos	Navneet Bhullar, Kamlesh Kumari, Dhiraj Sud	Chemical Engineering	Journal of Applied Polymer Science	2021	Online ISSN 1097-4628
<b>B. Scopus indexed Journals</b>					
<b>Title of paper</b>	<b>Name of the author/s</b>	<b>Department of the teacher</b>	<b>Name of journal</b>	<b>Year of publication</b>	<b>ISSN Number</b>
Electrochemical Mineralization Kinetics of Metformin	Meena, V.K., and Ghatak H.R.	Chemical Engineering	Asian Journal of Chemistry	2022	0970-7077
A novel manufacturing process of paper composite using recycled old newspaper sheets and phenol formaldehyde resin	Sinha, Akhouri Sanjay Kumar	Chemical Engineering	IPPTA	2021	3795462
Comparative study of Metallocene catalyst propylene polymerization with different iteration rates.	Subita Bhagat, Nikhil Prakash	Chemical Engineering	YMER	2021	0044-0477
Effect of temperature and pressure on the stability of metallocene catalyst with methyl aluminoxane	Subita Bhagat, Nikhil Prakash	Chemical Engineering	YMER	2022	0044-0477
Review on Recent Technological Advances in Carbon Dioxide Capture Sequestration/Storage	Akash Sood, Sandeep Mohan Ahuja, Avinash Thakur	Chemical Engineering	Journal of Tianjin University Science and Technology	2022	0493-2137
Recent Ameliorations in Membrane-Based Carbon Capture Technologies	Akash Sood, Avinash Thakur and Sandeep Mohan Ahuja	Chemical Engineering	Materials Today: Proceedings	2022	2214-7853
Synthesis of Biopolymer Chitosan-based Hydrogels with and without Crosslinker for Removal of Industrial Dye Procion Blue HERD: A Comparative Study	Bhullar N, Garg M, Kumari K, Sud D	Chemical Engineering	Indian Chemical Engineer	2022	Print ISSN: 0019-4506

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Amphiphilic chitosan/acrylic acid/thiourea based semi-interpenetrating hydrogel: Solvothermal synthesis and evaluation for controlled release of an organophosphate pesticide, Triazophos	Navneet Bhullar, Kamlesh Kumari, Dhiraj Sud	Chemical Engineering	Journal of Applied Polymer Science	2021	Online ISSN: 1097-4628		
Equilibrium and Thermodynamic Studies on Adsorption of Cadmium(II) from Aqueous Solutions by using Powdered Pods of Dalbergia Sissoo	Gulshan Kumar Jawa and Sandeep Mohan Ahuja,	Chemical Engineering	AIP Conf. Proc.	2021	ISSN 0094243X, 15517616		
Use of Biomaterials for Adsorption of Heavy Metals from Wastewater – A Review	Kiranjeet Kaur and Gulshan Kumar Jawa	Chemical Engineering	AIP Conf. Proc.	2021	ISSN 0094243X, 15517616		
<b>C. Other peer-reviewed Journals</b>							
<b>Title of paper</b>	<b>Name of the author/s</b>	<b>Department of the teacher</b>	<b>Name of journal</b>	<b>Year of publication</b>	<b>ISSN Number</b>		
Comparison of biomasses and study of acacia nilotica branches as an adsorbent material for phenol removal	Pushpa Jha	Chemical Engineering	International Journal of environmental impacts	2022	2398-2659		
<b>D. Full Paper in International conferences</b>							
<b>Title of paper</b>	<b>Name of the author/s</b>	<b>Department of the teacher</b>	<b>Name of journal</b>	<b>Year of publication</b>	<b>ISSN Number</b>	<b>Title of proceedings</b>	<b>Affiliating Institute</b>
Biopolethylene with Metallocene Catalysts: Process, Modeling & Simulation	Nikhil Prakash	Chemical Engineering	-	2021	9780816911165	Annual meeting of AIChE-2021	AIChE
A Reappraisal of Typical and Novel Fiber Forming Polymeric Materials	Nikhil Prakash	Chemical Engineering		2021	9780816911165	Annual meeting of AIChE-2021	AIChE
<b>E. Full Paper in National conferences</b>							

Department of Chemical Engineering Academic Audit: 2021-22

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN Number	Title of proceeding	Affiliating Institute
NIL							

4 Other publications									
a. Books published									
Name of the teacher	Title of the book published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
NIL									
b. Book Chapters									
Name of the teacher	Title of the book published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher

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Ahmad, K., Ghatak H.R., and Ahuja, S.M.	Advances in Chemical, Bio and Environmental Engineering.	A Review on the Valorization of Biorefinery Based Waste Lignin: Exploratory Potential Market Approach	-	<i>International Conference on Chemical, Bio and Environmental Engineering</i>	International	2022	978-3-030-96553-2	SLIET Longowal	Springer
Amandeep Singh, Kamlesh Kuman, Patit Paban Kundu	Handbook of Nanocelluloses: Classification, Properties, Fabrication, and Emerging Applications	Nanocellulose Biocomposites for Bone Tissue Engineering	-	-	-	2021	ISBN: 978-3-030-62976-2	SLIET Longowal	Springer
Amandeep Singh, Kamlesh Kumari, Patit Paban Kundu	Engineered Nanomaterials for Innovative Therapies and Biomedicine	Polyurethane Nanocomposites for Bone Tissue Engineering	-	-	-	2022	hardcover ISBN, 978-3-030-82917-9	SLIET Longowal	Springer Nature

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Amandeep Singh, Sovan Lal Banerjee, Kamlesh Kumari, Patti Paban Kundu	Handbook of Solid Waste Management Sustainability through Circular Economy	Recent Innovations in Chemical Recycling of Polyethylene Terephthalate Waste. A Circular Economy Approach Towards Sustainability	-	-	-	2022	DOI: <a href="https://doi.org/10.1007/978-981-15-7525-9">https://doi.org/10.1007/978-981-15-7525-9</a> ISBN-10 : 981164229X	SLIET Longowal	Springer, Singapore
Hemant Kumar, Amandeep Kaur, Amit Rai	Advances in Chemical, Bio and Environmental Engineering	Synthesis and Characterization of Copper (II) Schiff Base Metal Complex for Environmental Remediation	Advances in Chemical, Bio and Environmental Engineering	CHEMBIO EN	International	2022	978-3-030-96554-9	SLIET Longowal	SPRINGER



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	Kaleem Afnad, Amit Rai, Dinesh Chand	Advances in Chemical, Bio and Environmental Engineering	Groundwater quality Assessment by Using the water quality Index for Block Abohar, District Fazilka in Punjab	-	CHEMBIO EN	Internatio nal	2022	978-3-030-96554-9	SLIET Longow al	SPERING ER
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**Assessment rubrics**

2 marks for a patent, 2 marks for total impact factor, 2 marks for citation per faculty (WoS), 2 marks for citation per faculty (Scopus), 2 marks for citation per faculty (Google Scholar)	
Patent granted	2 marks
A patent published/filed	1 mark
Average impact factor $\geq 2$	2 marks
Average impact factor 1-2	1 mark
citation per faculty (WoS) $\geq 200$	2 marks
citation per faculty (WoS) 100-200	1 mark
citation per faculty (Scopus) $\geq 200$	2 marks
citation per faculty (Scopus) 100-200	1 mark
citation per faculty (Google Scholar) $\geq 300$	2 marks
citation per faculty (Google Scholar) 200-300	1 mark

**5. Collaborations with other departments (within the institute) and at National and International levels**

**2021-22:**

Joint PhD research guidance:

1. Prof. Kamlesh Kumari collaborated with Prof. P.P. Kundu of the Department of Polymer Science and Technology, University of Calcutta.
2. Prof. A. Thakur collaborated with Prof. P.S. Panesar of the FET Department, SLIET Longowal
3. Dr A.S.K. Sinha collaborated with Prof K.Prasad of the FET Department, SLIET Longowal

**Assessment rubrics**

Collaboration with other departments for 5 events in a year	10 marks
Collaboration with other departments for 4 events in a year	08 marks
Collaboration with other departments for 3 events in a year	06 marks
Collaboration with other departments for 2 events in a year	04 marks
Collaboration with other departments for 1 event in a year	02 marks

**6. Impact and Quality of Publications**

Average impact factor: 2.45

Total citations per faculty: WoS 26.0, Scopus 38.45, Google Scholar 48.72

**Assessment rubrics**

2.5 marks for total impact factor, 2.5 marks for citation per faculty (WoS), 2.5 marks for citation per faculty (Scopus), 2.5 marks for citation per faculty (Google Scholar)	
Average impact factor $\geq 2$	2.5 marks
Average impact factor 1-2	1.5 marks
Citation per faculty (WoS) $\geq 20$	2.5 marks
Citation per faculty (WoS) 10-20	1.5 marks
Citation per faculty (Scopus) $\geq 20$	2.5 marks
Citation per faculty (Scopus) 10-20	1.5 marks
Citation per faculty (Google Scholar) $\geq 30$	2.5 marks
citation per faculty (Google Scholar) 20-30	1.5 marks

**7. Relevance of Research to Knowledge Generation and Social Relevance**

The research done in the Department has contributed to the body of science as evidenced by the number and quality of publications. Moreover, the study is socially relevant as it aligns with the goal of sustainable development, one of the key thrust areas of the Govt. of India.

**2021-21:** Total No. of publications: 26

Thrust areas covered in publications: 9 out of 9

**Assessment rubrics**

5 marks for Knowledge Generation, 5 marks for Social Relevance concerning the thrust area	
Total publications $\geq 30$	5 marks
Total publications 20-30	4 marks
Total publications 10-20	3 marks
Total publications $< 10$	2 marks
All thrust areas covered	5 marks
No thrust area covered	0 marks

**8. Student Exposure to Attending Quality Conferences/Symposia**

No. of conferences attended by research scholars = 13

**Assessment rubrics**

2 marks each for a maximum of 10
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**9. Inter-departmental collaborations**

Joint PhD research guidance:

**2021-22**

1. Prof. A. Thakur collaborated with Prof. P.S. Panesar of the FET Department, SLIET Longowal
2. Dr A.S.K. Sinha collaborated with Prof. K. Prasad of the FET Department, SLIET Longowal

**Assessment rubrics**

2 marks each for collaboration for Ph. D. research guidance for collaboration for a sponsored project or other collaboration
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**10. Industry/externally funded sponsored research (Numbers and amount)****2021-2022**

1. Prof. S.M. Ahuja (PI) and Prof. A. Thakur (Co-PI); "Performance analysis and optimization for capturing CO<sub>2</sub> using amine solvents". AICTE RPS-NDF Scheme. Rs. 1600000.

**Assessment rubrics**

Project amounting to $\geq$ Rs. 50 lakhs	10 marks
Project amounting to Rs. 40-50 lakhs	9 marks
Project amounting to Rs. 30-40 lakhs	8 marks
Project amounting to Rs. 20-30 lakhs	7 marks
Project amounting to Rs. 10-20 lakhs	6 marks
Project amounting to Rs. 5-10 lakhs	5 marks
Project amounting to $<$ Rs. 5 lakhs	4 marks

C. Departmental Infrastructure

1. Adequacy of Classrooms and Multi-Media Facility

Room Description	No. available	Shared / Exclusive	Capacity (no. of persons)	Remarks
No. of classrooms (LCF 1 to 5)	05 (02 smart Classroom)	Shared with Food Engineering and Technology Department.	60	Required (exclusive): 08 Shortage: 03
Tutorial rooms (TCF 1 to 4)	04		30	Required (exclusive): 06 Short: 04
No. of Seminar Hall	01		100	02 Seminar Halls should be exclusive for Dept.
No. of Committee Rooms	01		40	
Multi-media facilities	Portable multi-media projectors - 03, laptops - 04	Exclusive		

- The classrooms of other departments are being used for students in our department
- Seminar Halls / mini auditoriums/auditoriums are used at another department or are centrally available.

**Assessment rubrics**

Availability of classes conducted in classrooms at departments >75%	6 marks
Availability of classes conducted in classrooms at departments >50% and <75%	4 marks
Availability of classes conducted in classrooms at departments >25% and <50%	2 marks
Availability of classes conducted in classrooms at departments >10% and <25%	1 mark
Availability of Multimedia facility in classrooms >75%	4 marks
Availability of Multimedia facility in classrooms >50% and >75%	3 marks
Availability of Multimedia facility in classrooms >25% and >50%	2 marks
Availability of Multimedia facility in classrooms < 25%	1 mark

2. Availability of Laboratories in the Department of Chemical Engineering:

Following are the laboratories with the described facilities in the department.

a) Computer Lab:

Students enjoy 12-hour access to the facilities offered by the Department Computing facility, which includes 05 workstations, 33 personal computers and several related peripherals. Each desktop PC is licensed to run dozens of software applications, including some of the most sophisticated technical packages available. The lab is updated regularly. Numerical models are developed for modelling chemical processes involving fluid flow, heat and mass transfer with chemical reactions. The mathematical models are solved with sophisticated software on

personal computers. Modelling and simulation software include Design Expert 8.0 and MATLAB as numerical tools for modelling fluid flow, heat transfer, and reactions in fluid/solid systems such as porous beds, membranes, reactors, and channels. Other software available in this lab is CHEMCAD, AutoCAD, COMSOL Multiphysics, C++ and Microsoft Office.

**b) Chemical Technology lab:**

This lab is equipped with viscometers, dilatometers, water baths, digital balance etc., to carry out basic experiments related to chemical technology. For example, iodine value, acid test, saponification value, solubility tests on vegetable oils, Molecular Weight determination, synthesis of polymer etc., can be performed here.

**c) CRE and Thermodynamics Lab:**

CRE & Thermodynamics Lab is equipped with the essential equipment to demonstrate to the students with various types of reactors and to study the applications of principles of chemical reaction engineering & thermodynamics. The lab is maintained for the students to impart practical exposure and experiences about the lab scale studies of the subject. It consists of significant equipment like CSTR, PFR, Batch Reactor, Adiabatic Reactor, Packed bed reactor and equipment for vapour-liquid equilibrium.

**d) Energy Technology lab:**

This lab caters to the needs of students of UG & PG levels. Highly sophisticated equipment like a Bomb calorimeter, Cloud & Pour Point Apparatus, Biodiesel Production Plant etc., is available in this lab. Students can perform all usual tests on fuels like coal, petrol, diesel and other biofuels with simple glassware, oven, furnace and flame & fire point apparatus.

**e) Environmental Engineering Lab/ Research lab II:**

This lab is developed to provide research facilities to the students for their research/project work. This lab will have significant equipment's/instruments like UV-VIS spectrophotometer, Gas chromatograph, Rotary Evaporator, Radiometer, BOD and COD etc., to analyze the wastewater/black liquor/industrial effluents characteristics and other chemical analysis. Presently lab has computational facilities for data analysis. Recently particle size analyzer and metal ion detector have also been procured. This laboratory will support carrying out any research work, especially related to the environment. It will be used as an interdisciplinary lab.

**f) Fluid and Particle Mechanics Lab:**

The lab is equipped with various apparatus like volumetric flow rate, average velocity, mass flow rate, Stoke's law apparatus, jaw crusher, ball mill, screens, plate and frame filter press, sedimentation set-up, rotary drum vacuum filter, and Bernoulli's apparatus to prove Bernoulli's theorem.

**g) Heat and Mass Transfer Lab:**

This lab helps the students to understand the basic concepts of heat and mass transfer: Conduction, Convection, Radiation, diffusion and leaching. To enhance their practical knowledge of industrial equipment, students perform the practicals on Shell-&-Tube heat exchangers, Cooling Tower, Open Pan Evaporators, Distillation Columns, and Solid-Gas and Liquid -Gas contact equipment.

**h) Paper Technology lab:**

This laboratory caters to the specialized training needs of certificate-level and undergraduate students of Paper Technology specialization. The laboratory is equipped with a 20 litre electrically heated circulation digester, a Valley Beater and a Schopper Reigler Tester, a Baur McNett Fiber Classifier, and sheet making facility including a Sheet Former, a Sheet Press, and Rotary Sheet Dryer facilities like physical and chemical analysis of papermaking raw

materials, pulp and black liquor, rheological properties of black liquor are also available. This laboratory caters to the specialized training needs of undergraduate and postgraduate students in the field of Paper Technology. Besides basic facilities for testing paper and paperboard for their physical, mechanical and optical properties, the laboratory is equipped with a state-of-the-art reflectance meter for the measurement of colour, brightness and opacity of paper in different geometries of illumination and viewing and the possibility for selecting various light sources.

**i) Polymer Processing Lab:**

This lab has equipment like automatic injection moulding, semi-auto rotational moulding, semi-auto vacuum forming, a two-roll mill, and hand moulding machines. Materials such as thermoplastics, thermo-sets, and rubbers can be processed to get the polymer products in the required shapes. The polymer processing lab helps the students understand how the raw material gets converted into a usable form by employing different moulding techniques.

**j) Polymer Testing Lab:**

The polymer testing lab is equipped with a melt flow index, Low-temperature brittleness tester, Environmental stress cracking resistance (ESCR) instruments, various equipment related to the AICTE research project such as a Universal tensile testing machine, Impact tester, Abrasion tester, Single screw extruder are also lying-in polymer processing lab.

**k) Process Dynamics and Control lab:**

The lab is well equipped to provide laboratory application of fundamental chemical process dynamics and control principles. This includes the study of open-loop dynamics of typical chemical engineering processes and closed-loop experiments involving control loop design, controller tuning etc.

**l) Research lab I :**

HPLC (Heat Deflection Temperature) HDT, High-pressure reactor, and Limiting Oxygen Index are some of the instruments presently available in this lab. This lab is used mainly for research purposes and has the facility to characterize/analyse the polymer sample/materials.

**m) Biochemical Engg. Lab/ Research Lab III**

A supercritical fluid extraction system, Fermenter, shaking incubator, autoclave, centrifuge etc. are some of the instruments presently available in this lab. This lab is used mainly for research purposes and has the facility for conducting Experiments for the PG course.

**n) Pilot plant/ Research lab IV**

The biodiesel plant and cyclone separator are the primary equipment available in the Pilot plant/ Research lab IV

**SHORTCOMINGS/ MORE REQUIREMENTS**

**More laboratories required/ shortcomings:**

- a. Technology Incubation cum Entrepreneurship Lab
- b. Energy Management and Audit Lab
- c. CVD Lab
- d. Petroleum and Petrochemical Lab
- e. Exclusive Pilot Plant
- f. Glass blowing Lab

Most laboratories are short in size concerning the student's strength.

**Assessment rubrics**

Laboratory space available/Laboratory space required to accommodate students' group	2 marks
Equipment availability for routine classes	2 marks
Equipment available for research purposes	2 marks
Shortage of laboratories	2 marks
Sizes of research labs	1 mark
Space for pilot plant	0 marks

**3. Availability of Conference/Seminar Room, etc:**

Description	No. available	Shared / Exclusive	Capacity (no. of persons)	Remarks
No. of Seminar halls	01	Shared with Food Engineering and Technology Department	100	Required: 01 exclusively for Chemical Engineering Dept
No. of Committee Rooms	01		40	Required: 01 exclusively for Chemical Engineering Dept.

- Seminar Hall 'J C Bose Hall' (400 persons) / Mini auditorium CSE Block (120 persons)/ Main Auditorium (1200 persons) etc. are used at another department or centrally available at the institute.

**Assessment rubrics**

Conference room availability (exclusive) at the department	3 marks
Seminar Hall (exclusive) at the department	3 marks
The capacity of the conference/ seminar halls is >250 person	4 marks
The capacity of the conference/ seminar halls is >100 and < 250 persons	3 marks
The capacity of the conference/ seminar halls is <100 person	2 marks

**4. Availability of Seating Space for Faculty and Research Students**

- List of Faculty Rooms:

S.No.	Floor	Number of Faculty Rooms
1.	Ground Floor	08
2.	First Floor	04
3	Second Floor	03

- The seating space of Research scholars is in their respective labs/workplace

**Assessment rubrics**

Adequate number of faculty rooms available (as per designation/ outside the labs)	4 marks
Adequate sizes of faculty rooms	3 marks
Adequate space available for research students	3 marks

### 5. Availability of Internet Services in Research Labs and Classrooms

80% of the research labs and classrooms are equipped with high-speed internet service through LAN (wired) and also connected through the Wi-Fi system available in the department.

#### Assessment rubrics

Availability of wired LAN connections	2 marks
Adequate Internet speed	3 marks
Availability of wired LAN connections	2 marks
Adequate Wi-Fi signal quality	1 marks

### 6. Departmental Library and E-Resources

The departmental Library includes a sufficient no. of text/ reference books (774 nos.) for catering to the regular need of the students/ staff/ faculty (for reading at a library/ overnight issue) other than the central library (Book bank/ Textbook section/ Reference book section/ Digital library)

Access to the e-resources is available to all students/ staff/ faculty through their login ID at any place. In addition, the institute has subscribed to many e-books, e-journals etc.

#### Assessment rubrics

Availability of Books and e-resources within the department	5 marks
Sufficiency of Computer and internet facilities for access to e-resources	3 marks
Adequate seating capacity of department library	2 marks

### 7. Computing Facilities and Software

S.No.	Name of Software	Date of Purchase	Cost of Equipment (Rs.)
1.	Design Expert	28.12.2011	238000/-
2	CONSOL multi-physics (Single user 5.5)	17.03.2020	2.35 Lacs
3	Chemical Reaction Engineering Modules	17.03.2020	
4	CHEM-CAD	20.03.2020	5.86 Lacs
5	MATLAB	-	-
6	MS OFFICE 365	-	-

In addition to the above, purchasing the software ASPEN/ HYSIS is under process.

#### Assessment rubrics

Adequate availability of software	5 marks
Adequate number and configuration of computers	3 marks
Adequate lab space and allied services availability	Marks

### 8. Adequacy of Offices and Furnishing for Faculty

Sufficient office rooms for faculty are available with the necessary furnishing requirements. However, the sizes of some of the available office rooms are short and some of the office



rooms are inside the laboratories. Therefore, more faculty rooms may be available for further recruitment.

#### Assessment rubrics

Adequate number of faculty rooms available (as per designation/ outside the labs)	2 marks
Sizes of faculty rooms	3 marks
Furnishing of the room	5 marks

#### 9. Faculty-Student Ratio

Total no. of students in dept. (sanctioned ICD/B.E./M.E.) = 300 nos.  
(Excluding 1st-year students as considered for subjects of other departments)

##### No. of Faculty Members in dept.:

Professor: 05 nos.

Associate Prof.: 02 nos.

Asst. Prof.: 04 nos.

Guest Faculty: 02 nos.

Faculty-student Ratio of the Department of Chemical Engg., SLIET during 2020-21 is found to be 1:23, which is good as per AICTE/ NBA guidelines.

#### Assessment Rubrics

Faculty-student ratio $\leq 1:15$	10 marks
Faculty-student ratio $> 1:15$ and $< 1:20$	8 marks
Faculty-student ratio $> 1:20$ and $< 1:25$	6 marks

#### 10. Support Staff (Technical/Administrative) Adequacy

No. of Technicians/ Sr. Technicians (Regular): 03 nos.

No. of Technicians (on Contract) : 03 nos.

No. of Lab Attendant : 01 no.

Administrative staff (Clerk/ MTS) : 02 nos.

#### Assessment rubrics

Adequate technical staff/lab $> 1$	5 marks
Adequate technical staff/lab = 1	4 marks
Adequate technical staff/lab $> 1$	3 marks
Adequate Technical Staff regularly	2 marks
Adequate Technical Staff regularly	3 marks

Department of Chemical Engineering Academic Audit: 2021-22

**D. Outcomes**

**1. Placement**

Program	2021-22	
	Placement %	Marks
ICD	3	1
B. Tech	43.5	2
Masters Student	-	0
Ph. D Students	100	2

**Assessment rubrics**

Placement %age/higher studies for ICD >80%	2 marks
Placement %age/higher studies for ICD >50% and<80%	1.5 marks
Placement %age/higher studies for ICD ≥30% and<50%	1 mark
Placement %age/higher studies for ICD<30%	0.5 mark
Placement %age/higher studies for UG >80%	4 marks
Placement %age/higher studies for UG >50% and<80%	3 marks
Placement %age/higher studies for UG ≥30% and<50%	2 marks
Placement %age/higher studies for UG<30%	1 marks
Placement %age/higher studies for PG >80%	2 marks
Placement %age/higher studies for PG >50% and<80%	1.5 marks
Placement %age/higher studies for PG ≥30% and<50%	1 mark
Placement %age/higher studies for PG<30%	0.5 mark
Placement %age/higher studies for PhD. >80%	2 marks
Placement %age/higher studies for PhD. >50% and<80%	1.5 marks
Placement %age/higher studies for PhD. ≥30% and<50%	1 mark
Placement %age/higher studies for Ph.D. ≥1% and<30%	0.5 mark

**2. Average Number of Ph. Ds awarded per the year**

2021-2022: Thesis submitted: NIL

**Assessment rubrics**

Number of PhD defence in an academic year =3	07 Marks
Number of PhD defence in an academic year = 2	05 marks
Number of PhD defence in an academic year = 1	03 marks
Number of PhD submitted apart from the defence in an academic year ≥ 2	04 marks
Number of PhD submitted apart from the defence in an academic year = 1	02 marks

(Limited to a maximum of 10 marks)

**3. Publications per Faculty in Indexed Journals/Year (Average of last three years)**

Academic Year	2019-20	2020-21	2021-22
Total No. of publications	23	10	26
Average no. of publications/faculty	23/11= 2.1	10/11= 0.91	26/11=2.36

**Assessment rubrics**

Average Number of publications/faculty in last academic year ≥ 2	10 Marks
Average Number of publications/faculty in last academic year ≥1.5 and<2	08 Marks

Average Number of publications/faculty in last academic year $\geq 1$ and $<1.5$	06 Marks
Average Number of publications/faculty in last academic year $\geq 0.5$ and $<1$	04 Marks
Average Number of publications/faculty in last academic year $\geq 0.1$ and $<0.5$	02 Marks

**4. Average Citations per Faculty/Year (Last Three Years) (Web of Science/Scopus)**

Academic Year	2019-20	2020-21	2021-22
Total No. of Citations (WOS/Scopus)	234	346	709
Average no. of citations/faculty (WOS/Scopus)	$234/11 = 21.27$	$346/11 = 31.5$	$709/11 = 64.45$
Average last three-year Citations/faculty	39.07		

**Assessment rubrics**

Average Number of citations/faculty in last academic year $\geq 25$	10 Marks
Average Number of citations/faculty in last academic year $\geq 20$ and $<25$	08 Marks
Average Number of citations/faculty in last academic year $\geq 15$ and $<20$	06 Marks
Average Number of citations/faculty in last academic year $\geq 10$ and $<15$	04 Marks
Average Number of citations/faculty in last academic year $\geq 5$ and $<10$	02 Marks

**5. Recognitions; Awards (National/International) to Faculty/Students 2021-22:**

- Harsh Raj (2130354): Chemjet, 2<sup>nd</sup> Prize Winner, Techfest 2022, SLIET
- Shubham Kumar(2030357), Yuvraj Kumar (2030351), Lovepreet Singh (2030355), 1st Position in Vayuneer, Techfest 2022, SLIET.
- Nitish Bhardwaj (1940096), 1st Position in Chem-e-thon, Techfest 2022, SLIET
- Nitish Bhardwaj (1940096), 1st Position in Azadi ka Amrit Mahotsav Presentation Competition, Techfest 2022, SLIET
- Abhishek Kumar (2030361), Mudita Sinha (20303700), Chem-jet-Champion, 1st Position, Techfest 2022, SLIET
- Abhishek Kumar (2030361), Mudita Sinha (20303700), Chem-e-Car, 2nd Position, Techfest 2022, SLIET
- Abhishek Kumar (2030361), Mudita Sinha (20303700), Techno mind, 3rd Position, Techfest 2022, SLIET
- Abhishek Kumar (2030361), Mudita Sinha (20303700), Chemithon, Consolation Prize, Techfest 2022, SLIET
- Arti Gupta (2040023), Tanu Shakya (2040007), Shreya Singh(20400110): Chemjet, 3<sup>rd</sup>Prize Winner, Techfest 2022, SLIET.
- Shivandram Sharma( 2140007), Margdarshak , 3<sup>rd</sup> Position, Techfest 2022, SLIET.

**Assessment rubrics**

Total number of awards in an academic year $\geq 5$	10 Marks
Total number of awards in an academic year $\geq 4$ and $<5$	08 Marks
Total number of awards in an academic year $\geq 3$ and $<4$	06 Marks
Total number of awards in an academic year $\geq 2$ and $<3$	04 Marks
Total number of awards in an academic year $\geq 1$ and $<2$	02 Marks

Department of Chemical Engineering Academic Audit: 2021-22

**6. Consultancy and Externally Funded Projects**

Industry/externally funded sponsored research(Numbers and amount)

**2021-22:**

1. Prof. S.M. Ahuja (PI) and Prof. A. Thakur (Co-PI). "Performance analysis and optimization for capturing CO<sub>2</sub> using amine solvents". AICTE RPS-NDF Scheme. Rs. 1600000.

**Assessment rubrics**

Project amounting to $\geq$ INR 50 lakhs	10 marks
Project amounting to INR 40-50 lakhs	9 marks
Project amounting to INR 30-40 lakhs	8 marks
Project amounting to INR 20-30 lakhs	7 marks
Project amounting to INR 10-20 lakhs	6 marks
Project amounting to INR 5-10 lakhs	5 marks
Project amounting to $<$ INR 5 lakhs	Marks

**7. No. of PhD graduates who took Academics as a Career (Last 5 Years)**

**Total no. of students who took Academics as a Career (Last 5 Years):07**

**Assessment rubrics**

The number of students who took Academics as Career $\geq$ 5	10 Marks
The number of students who took Academics as Career $\geq$ 4 and $<$ 5	08 Marks
The number of students who took Academics as Career $\geq$ 3 and $<$ 4	06 Marks
Some students took Academics as Career $\geq$ 2 and $<$ 3	04 Marks
The number of students who took Academics as Career=1	02 Arks

**8. Students offered higher studies**

**2021-22**

No. of students: 02; total no. of students: 62; % of students opted for higher studies: 3.2

**Assessment rubrics**

% of students opted for higher studies in an academic year $\geq$ 20	10 Marks
% of students opted for higher studies in an academic year $\geq$ 15 and $<$ 20	08 Marks
% of students opted for higher studies in an academic year $\geq$ 10 and $<$ 15	06 Marks
% of students opted for higher studies in an academic year $\geq$ 5 and $<$ 10	04 Marks
% of students opted for higher studies in an academic year $\geq$ 0.1 and $<$ 5	02 Marks

**9. No. of qualified students NET/GATE/CAT etc**

**(State/Central Civil Services): 02**

**2021-2022**

No. of students who qualified GATE: 02; total no. of students: 62; % of students qualified GATE: 3.2

**Assessment rubrics**

% of students qualified for GATE in an academic year $\geq$ 20	10 Marks
% of students qualified for GATE in an academic year $\geq$ 15 and $<$ 20	08 Marks
% of students qualified for GATE in an academic year $\geq$ 10 and $<$ 15	06 Marks
% of students qualified GATE in an academic year $\geq$ 5 and $<$ 10	04 Marks
% of students qualified GATE in an academic year $\geq$ 0.1 and $<$ 5	02 Marks

**10. Entrepreneurship**

**2021-22 (UG):**

No. of students: 01; total no. of students: 62; % of students who took part in the Entrepreneurship Programme: 1.6

**Assessment rubrics**

% of students opted for entrepreneurship in an academic year $\geq 20$	10 Marks
% of students opted for entrepreneurship in an academic year $\geq 15$ and $< 20$	08 Marks
% of students opted for entrepreneurship in an academic year $\geq 10$ and $< 15$	06 Marks
% of students opted for entrepreneurship in an academic year $\geq 5$ and $< 10$	04 Marks
% of students opted for entrepreneurship in an academic year $\geq 0.1$ and $< 5$	02 Marks

