SELF ASSESSMENT REPORT (SAR)

For

Accreditation of

Bachelor of Technology (B. Tech) in

Chemical Engineering

By

National Board of Accreditation

NBCC Place, 4th Floor East Tower, BhishamPitamah

Marg, PragatiVihar New Delhi 110003

P: +91(11)24360620-22, 24360654

Fax: +91(11) 24360682

CHEMICAL ENGINEERING DEPARTMENT

NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Hazratbal, Srinagar – 190006, J&K (India)

SAR Contents

PART A: INSTITUTIONAL INFORMATION

1. **Name and Address of The Institution:** National Institute of Technology Srinagar (NIT Srinagar)

Address	**City: Srinagar**
State:- Jammu & Kashmir	Pin Code:- 190006
Website:- www.nitsri.ac.in	E-mail:- admin_csc@nitsri.ac.in
STD Code:- 0194	Phone No:- 2422032
Fax STD Code:- 0194	Fax:- 2420475

Table A.1

2. **Name and Address of the Affiliating University:** None
3. **Year of establishment of the Institution:** 1960
4. **Type of the Institution:** Institute of National Importance
5. **Ownership Status**: Central Government
   (Provide Details: Appendix 1 of part A)

6. **Other Academic Institutions of the Trust/Society/Company etc., If Any:** None
7. **Details of all the programs being offered by the institution under consideration:**

S. No.	**Programme Name (Current Intake)**	**Name of Depart-ment**	**Year of Start**	**Intake**	**Increase in Intake**	**Year of Increase**	**AICTE Appro-val**	**Accreditation Status**
1	B.Tech, Chemical Engineering (103)	Chemical Enginee-ring	1963	27	50	2009	Senate	Accredited by NBA F. NO NBA/ ACCR/106/2002 May 19 2009
2	M.Tech, Chemical Engineering (19)		2015	19				
3	Ph.D., Chemical Engineering		2008	05	11	2019		
4	B.Tech, Civil Engineering (183)	Civil Enginee-ring	1960	50	73	2009		Accredited by NBA F. NO NBA/ ACCR/106/2002 May 19 2009
5	M.Tech, Transportation (16)		2014	16				
6	M.Tech,		2004	25				

	Structure (25)							
7	M.Tech, Geotechnical (15)		2014	15				
8	M.Tech, Water resource Engineering (13)		1986	13				
9	Ph.D., Civil Engineering		2006	02	22	2019		
10	B.Tech, Computer science Engineering (84)	Computer science Engineering	2007	62				
11	Ph.D., Computer science Engineering		2010	01	05	2019		
12	B.Tech, Electrical Engineering (113)	Electrical Engineering	1960	50	27	2009		Accredited by NBA F. NO NBA/ ACCR/106/2002 May 19 2009
13	M.Tech, Electrical power and energy system (26)		2013	26				
14	M.Tech, Power Electronics & electrical drives (26)		2020	26				
15	Ph.D., Electrical Engineering		2004	01	18	2019		
16	B.Tech, Electronics and Communication Engineering (106)	Electronics and CommunicationEnginee-ring	1984	50	27	2009		Accredited by NBA F. NO NBA/ ACCR/106/2002 May 19 2009
17	M.Tech, Communication and information Technology (25)		2004	25				
18	M.Tech, Microelectronics (14)		2015	14				
19	Ph.D., Electronics and Communication Engineering		2005	01	15	2019		
20	B.Tech,	Mechani-	1960	50	27	2009		Accredited by

	Mechanical Engineering (117)	calEngine e-ring						NBA F. NO NBA/ ACCR/106/2002 May 19 2009
21	M.Tech, Mechanical system design (25)		2004	25				
22	M.Tech, Industrial tribology and maintenance (26)		2013	26				
23	Ph.D., Mechanical Engineering		2008	10	32	2019		
24	B.Tech, Metallurgical and Materials Engineering (106)	Metallur-gical and Materials Enginee-ring	1960	15	62	2009		Accredited by NBA F. NO NBA/ ACCR/106/2002 May 19 2009
25	Ph.D., Metallurgical and Materials Engineering		2008	05	05	2019		
26	B.Tech, Information Technology (87)	Informa-tion Techno-logy	2007	62				
27	Ph.D., Information Technology		2018	05	03	2019		
28	M.Sc., Physics (31)	Physics	2015	31				
29	Ph.D., Physics		2004	02	11	2019		
30	M.Sc., Chemistry (30)	Chemis-try	2020	30				
31	Ph.D., Chemistry		2005	01	09	2019		
32	Ph.D., Humanities& Social Science	Humanit-ies& Social Science	2004	02	03	2019		
33	Ph.D., Mathematics	Mathe-matics	2006	02	07	2019		

Table A.7

8. Programs to be considered for Accreditation vide this application

S. No.	Program Name
1	B. Tech. Chemical Engineering
2	B. Tech. Civil Engineering
3	B. Tech. Electrical Engineering
4	B. Tech. Electronics and Communication Engineering,
5	B. Tech. Mechanical Engineering

Table A.8

9. Total number of employees:

A. Regular Employees (Faculty and Staff):

Items		2020-21		2019-20		2018-19	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M	105	106	79	79	78	80
	F	17	17	16	16	16	16
Faculty in Maths, Science & Humanities teaching in engineering Programs	M	25	26	21	21	20	21
	F	7	7	6	6	6	6
Non-teaching staff	M	174	194	194	206	206	223
	F	17	19	19	20	20	22

Table A.9a

B. Contractual Staff Employees (Faculty and Staff): (Not covered in Table A.9a):

Items		2020-21		2019-20		2018-19	
		Min	Max	Min	Min	Max	Min
Faculty in Engineering	M	19	19	20	20	37	37
	F	24	24	21	21	26	26
Faculty in Maths, Science & Humanities teaching in engineering Programs	M	3	3	2	2	5	5
	F	5	5	5	5	3	3
Non-teaching staff	M	338	338	190	190	169	169
	F	35	35	15	15	13	13

Table A.9b

10. Total number of Engineering Students

Item	2020-21	2019-20	2018-19
Total no. of boys	2707	2370	2245
Total no. of girls	578	436	386
Total no. of students	3285	2806	2631

Table A.10

11. Vision of the Institution:

To establish a unique identity of a pioneer technical Institute by developing a high quality technical manpower and technological resources that aim at economic and social development of the nation as a whole and the region, in particular, keeping in view the global challenges.

12. Mission of the Institution:

M1. To create a strong and transformative technical educational environment in which fresh ideas, moral principles, research and excellence nurture with international standards.

M2. To prepare technically educated and broadly talented engineers, future innovators and entrepreneurs, graduates with understanding of the needs and problems of the industry, the society, the state and the nation.

M3. To inculcate the highest degree of confidence, professionalism, academic excellence and engineering ethics in budding engineers.

13. Contact Information of the Head of the Institution and NBA Coordinator, if designated:

Head of the Institution

Name:- Dr.Rakesh Sehgal Designation:- Director

Status of Appointment:- By Ministry of Education, Government of India

Contact details of Head of the Institution

STD Code:- 0194 Telephone No:- 2422032

Mobile:- 09419433770, 9418058442 E-mail:- director@nitsri.net

Fax STD Code:- 0194 Fax No:- 2420475

NBA Coordinator

Name:- Dr. Aijaz Hussain Mir Designation:- Professor

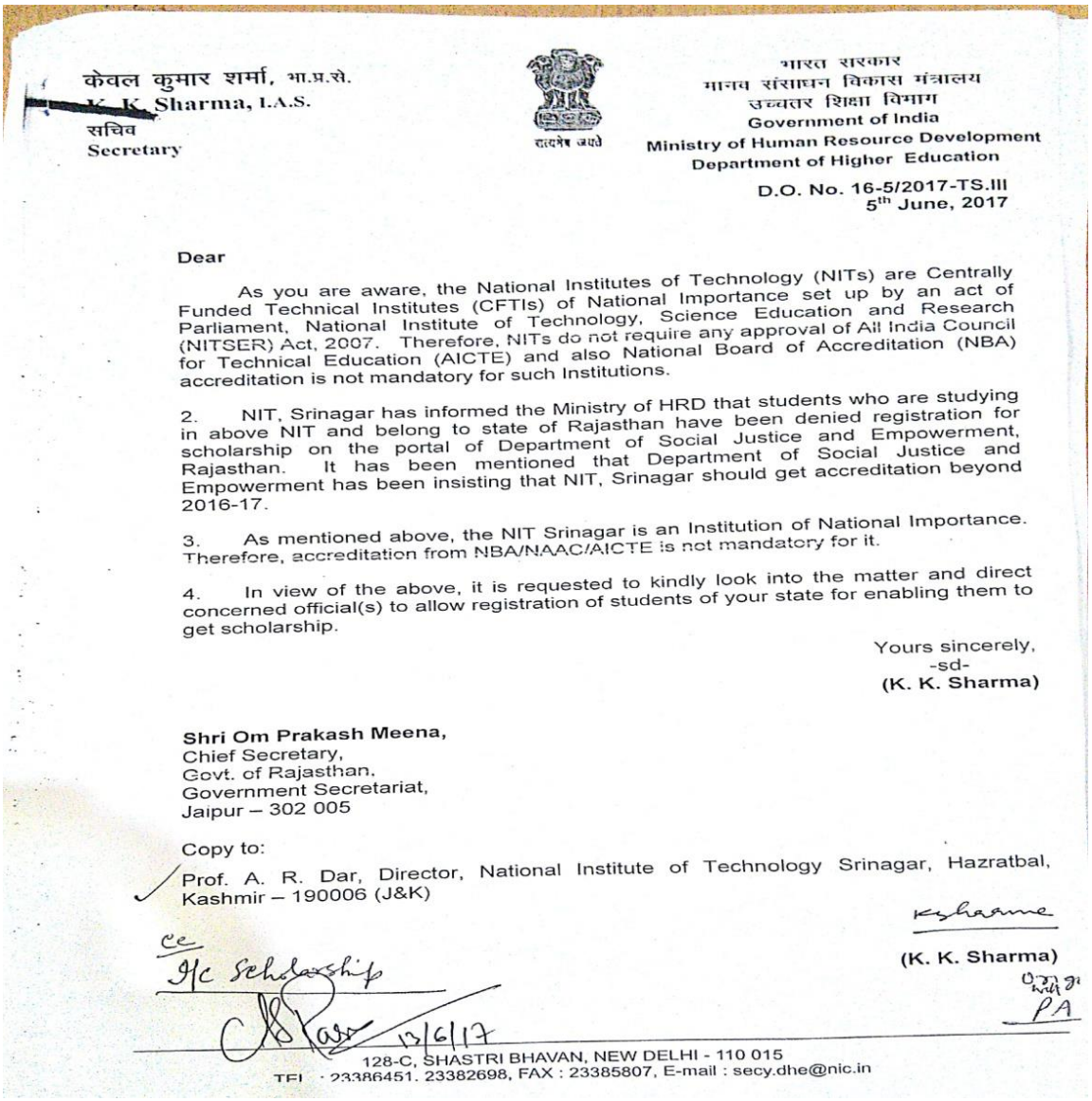
STD Code:- 0194 Telephone No:- 0782705

Mobile:- +91-7006836408 E-mail:- ahmir@nitsri.net

NBA Co-coordinator

Name:- Dr. Harveer Singh Pali Designation:- Assistant Professor

Appendix 1 of part A



केवल कुमार शर्मा, भा.प्र.से.
K. K. Sharma, I.A.S.
सचिव
Secretary

सत्यमेव जयते

भारत सरकार
मानव संसाधन विकास मंत्रालय
उच्चतर शिक्षा विभाग
Government of India
Ministry of Human Resource Development
Department of Higher Education

D.O. No. 16-5/2017-TS.III
5th June, 2017

Dear

As you are aware, the National Institutes of Technology (NITs) are Centrally Funded Technical Institutes (CFTIs) of National Importance set up by an act of Parliament, National Institute of Technology, Science Education and Research (NITSER) Act, 2007. Therefore, NITs do not require any approval of All India Council for Technical Education (AICTE) and also National Board of Accreditation (NBA) accreditation is not mandatory for such Institutions.

2. NIT, Srinagar has informed the Ministry of HRD that students who are studying in above NIT and belong to state of Rajasthan have been denied registration for scholarship on the portal of Department of Social Justice and Empowerment, Rajasthan. It has been mentioned that Department of Social Justice and Empowerment has been insisting that NIT, Srinagar should get accreditation beyond 2016-17.

3. As mentioned above, the NIT Srinagar is an Institution of National Importance. Therefore, accreditation from NBA/NAAC/AICTE is not mandatory for it.

4. In view of the above, it is requested to kindly look into the matter and direct concerned official(s) to allow registration of students of your state for enabling them to get scholarship.

Yours sincerely,
-sd-
(K. K. Sharma)

Shri Om Prakash Meena,
Chief Secretary,
Govt. of Rajasthan,
Government Secretariat,
Jaipur – 302 005

Copy to:

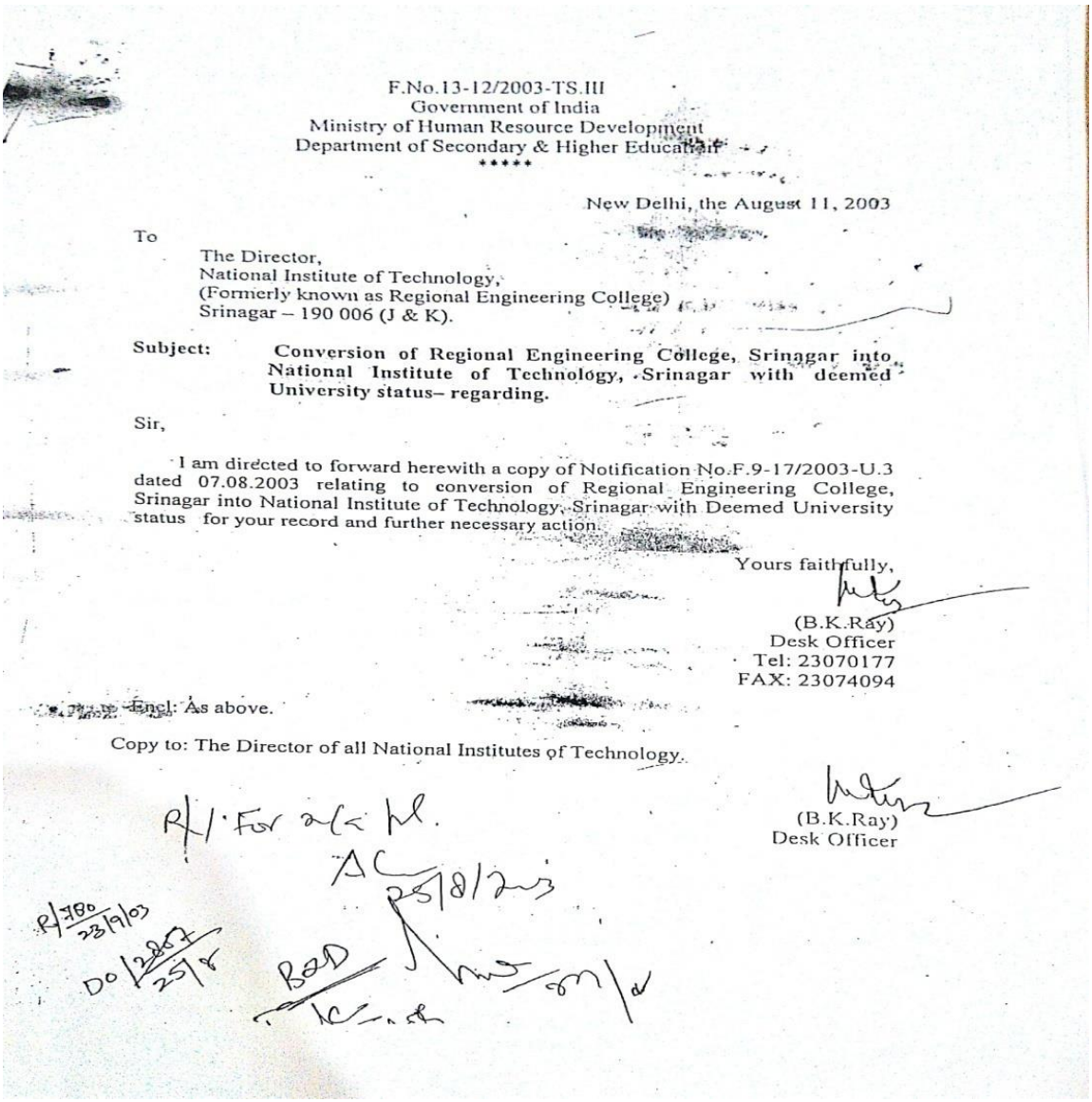
Prof. A. R. Dar, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir – 190006 (J&K)

(K. K. Sharma)

cc
Hc Scholarship
13/6/17
PA

128-C, SHASTRI BHAVAN, NEW DELHI - 110 015
TEL : 23386451, 23382698, FAX : 23385807, E-mail : secy.dhe@nic.in

Figure A.1a



F.No.13-12/2003-TS.III
Government of India
Ministry of Human Resource Development
Department of Secondary & Higher Education
*****

New Delhi, the August 11, 2003

To

The Director,
National Institute of Technology,
(Formerly known as Regional Engineering College)
Srinagar – 190 006 (J & K).

Subject: Conversion of Regional Engineering College, Srinagar into National Institute of Technology, Srinagar with deemed University status– regarding.

Sir,

I am directed to forward herewith a copy of Notification No.F.9-17/2003-U.3 dated 07.08.2003 relating to conversion of Regional Engineering College, Srinagar into National Institute of Technology, Srinagar with Deemed University status for your record and further necessary action.

Yours faithfully,

(B.K.Ray)
Desk Officer
Tel: 23070177
FAX: 23074094

Encl: As above.

Copy to: The Director of all National Institutes of Technology.

(B.K.Ray)
Desk Officer

Figure A.2b

PART B: Criteria Summary

Name of the program: B.Tech in Chemical Engineering

Criteria No.	Criteria	Marks/Weightage	
		Max.	**Claimed**
Program Level Criteria			
1	Vision, Mission and Program Educational Objectives	50	50
2	Program Curriculum and Teaching – Learning Processes	100	95
3	Course Outcomes and Program Outcomes	175	175
4	Students' Performance	100	69
5	Faculty Information and Contributions	200	147.36
6	Facilities and Technical Support	80	80
7	Continuous Improvement	75	70
Institute Level Criteria			
8	First Year Academics	50	43.46
9	Student Support Systems	50	50
10	Governance, Institutional Support and Financial Resources	120	120
	Total	**1000**	**899.82**

CRITERION 1	Vision, Mission and Program Educational Objectives	50
	Marks Claimed	**50**

1.1 State the Vision and Mission of the Department and Institute (5) **Claimed 5**

About NIT Srinagar

National Institute of Technology Srinagar (formerly REC Srinagar) is one of the premier Educational Institutes in the Northern Regions of the country. It was established in 1960 and has been one of the eighteen Regional Engineering Colleges sponsored by the Government of India during the second plan. The institute acquired the status of National Institute of Technology with deemed to be University status during August 2003 and attained full autonomy in its Academics.

The Institute is situated at the banks of world-famous Dal Lake, with the far-famed Hazratbal Shrine on another side of the campus. NIT Srinagar is a residential Institute with accommodation facility in Hostels and Staff-Quarters. There are four Boys and one Girls hostel which swallops about 1500 boys and 200 girls. Besides running the B. Tech. Programme the Institute also offers M. Tech programme in many streams. In addition to that, a large number of students are registered for M. Phil and Ph.D. Programmes.

Facilities and amenities are available at the institution such as Bank, Consumer cum Society, Shopping Complex, Recreational Centre, and Dispensary with Ambulance, Guest House, Students Activity Centre, Gymnasium, Internet Centre, Telephone Booths, Fax Services, Diesel Generator, and Bus Facility. The institution has an Industry Interaction Cell which was established in 1989 with the aim to remain at the fore-front on the scientific and technological development and to share its experience with industries in utilizing man-power and other resources are available at the institute effectively with the assistance of the participating industries. The institute has one of the best technical library in J&K state. It has a collection of over 60,000 books on engineering science and humanities and about 6,000 bound volumes/journals, both foreign and Indian. The library remains open from 9.00 am to 10 pm. It has online repository of A.S.C.E, A.S.M.E.A.E.L, and J.C.C.C etc in addition to journals through I.N.S.E.S, COMSORTIEM. It also has a collection of I.S.I codes, in the C.D-Rom format.

Vision of the Institute

To establish a unique identity of a pioneer technical Institute by developing a high quality technical manpower and technological resources that aim at economic and social development of the nation as a whole and the region in particular keeping in view the global challenges.

Mission of the Institute

M1. To create a strong and transformative technical educational environment in which fresh ideas, moral principles, research and excellence nurture with international standards.

M2. To prepare technically educated and broadly talented engineers, future innovators and entrepreneurs, graduates with understanding of the needs and problems of the industry, the society, the state and the nation.

M3. To inculcate the highest degree of confidence, professionalism, academic excellence and engineering ethics in budding engineers.

About the Chemical Engineering Department

Department of Chemical Engineering was established in the year 1963 for five year undergraduate programme with total student intake of 25. The duration of degree was changed later in the year 1981 to four years. Currently Department offers B.Tech and M.Tech degree programmes with total intake of 103 and 18 students respectively. Students are also pursuing their Ph.D. research under the guidance of faculty members of the Department. As we know Chemical engineering requires basic knowledge of chemistry, biology, physics, and mathematics, the course syllabus has been accordingly devised. The course schemes at B.Tech and M.Tech level include the fundamental subjects like; reaction engineering, thermodynamics, transport phenomena and mass transfer etc. A range of complementary elective courses also exists in the schemes. The students are rigorously trained and evaluated on a continuous basis in order to transform them into world class Chemical Engineers. The academic programme schemes have also been designed in tune with the requirements of the industry. The Department has well equipped laboratories to compliment the theoretical courses taught at graduate and post graduate level and to handle research in thrust areas like energy, environment, biotechnology and separation processes etc.

Vision of the Department

To be one of the leading Chemical Engineering Departments in the Country engaged with teaching, research and training of students with high moral values to solve the problems of Chemical and Allied industries for meeting the aspirations of society.

Mission of the Department

M1. To create and sustain the strong foundations of Chemical Engineering education, research and innovation.

M2. To produce well qualified, innovative Chemical Engineers with entrepreneurial skills & leadership qualities to face and solve the problems of industries and the society at large.

M3. To make professional leaders, academicians and engineers with high moral values and ethics.

1.2. State the Program Educational Objectives (PEOs) (5)

Claimed 5

Program Educational Objectives of the Department

PEO1 **:** Providing broad-based Chemical Engineering education on the solid foundations of mathematics, basic sciences, engineering and social studies by choice based credit system.

PEO2 **:** Enable the students to become future leaders in engineering practices for the overall betterment of society and instill in them a work culture based on foundations of ethics, scientific temperament and team work.

PEO3 **:** Equip the students with knowledge, understanding and applications of Chemical Engineering tools for enabling them to pursue innovative research.

PEO4 **:** Attain excellence in engineering and design through education in the principles and practices of Chemical Engineering.

1.3 Indicate where the Vision, Mission and PEOs are published and disseminated among stakeholders (15)

Claimed 15

Locations where the Vision, Mission, PEOs and PSOs are published:

Sr. No.	Location	Institute		Department			
		Vision	Mission	Vision	Mission	PEOs	PSOs
1.	Institute Website/ Departmental Webpage	✓	✓	✓	✓	✓	✓
2.	Department Notice Board	✓	✓	✓	✓	✓	✓
3.	Course file	✓	✓	✓	✓	✓	✓
4.	Lab Manual	✓	✓	✓	✓	✓	✓
5.	Conference workshop/Brochures	✓	✓	✓	✓		

Table B.1.3a

Locations where the Vision, Mission, PEOs and PSOs are disseminated:

Sr. No.	Location	Institute		Department			
		Vision	Mission	Vision	Mission	PEOs	PSOs
1.	Department Office	✓	✓	✓	✓	✓	✓
2.	HOD Room	✓	✓	✓	✓	✓	✓
3.	Class Rooms	✓	✓	✓	✓	✓	✓
4.	Laboratories	✓	✓	✓	✓	✓	✓
5.	Department Entrance	✓	✓	✓	✓	✓	
6.	Seminar/ Conference Hall	✓	✓	✓	✓	✓	✓
7.	Corridor	✓	✓	✓	✓	✓	

Table B.1.3b

Apart from this Vision, Mission, PEOs and PSOs are disseminated to all the stakeholders of the program through faculty meetings, student awareness workshops, student induction programs and placement and training activities at regular intervals.

List of stake holders of the program

1. Students.
2. Alumni.
3. Parents and Society.
4. Faculty and Staff Members.
5. Industries and Research Organisations.

1.4 State the process for defining the Vision and Mission of the Department, and PEOs of the program (15)

Claimed 15

Process for defining Vision and Mission of Department

The Department established the Vision and Mission through a consultative process involving the stakeholders of the Department, the future scope of the department and the societal requirements as shown in Figure B.1.4a. In establishing the Vision and mission of the Department, the following steps were followed:

Step 1:	*The Vision and Mission statements of the Department were first proposed by the committee setup by the Department under chairmanship of Head of the Department keeping Vision and Mission of Institute in view.*
Step 2:	*Proposed Vision and Mission statements have been circulated among the stake holders.*
Step 3:	*Deliberations on the suggestions received regarding new draft of Vision and Mission statements were modified as per feedback received by stake holders.*

Step 4:	*The modified Vision and Mission of the Department were kept in front of the Departmental Faculty Board (DFB) for approval.*
Step 5:	*Departmental Faculty Board (DFB) approved the Vision and Mission Statements under the chairmanship of Head of the department.*

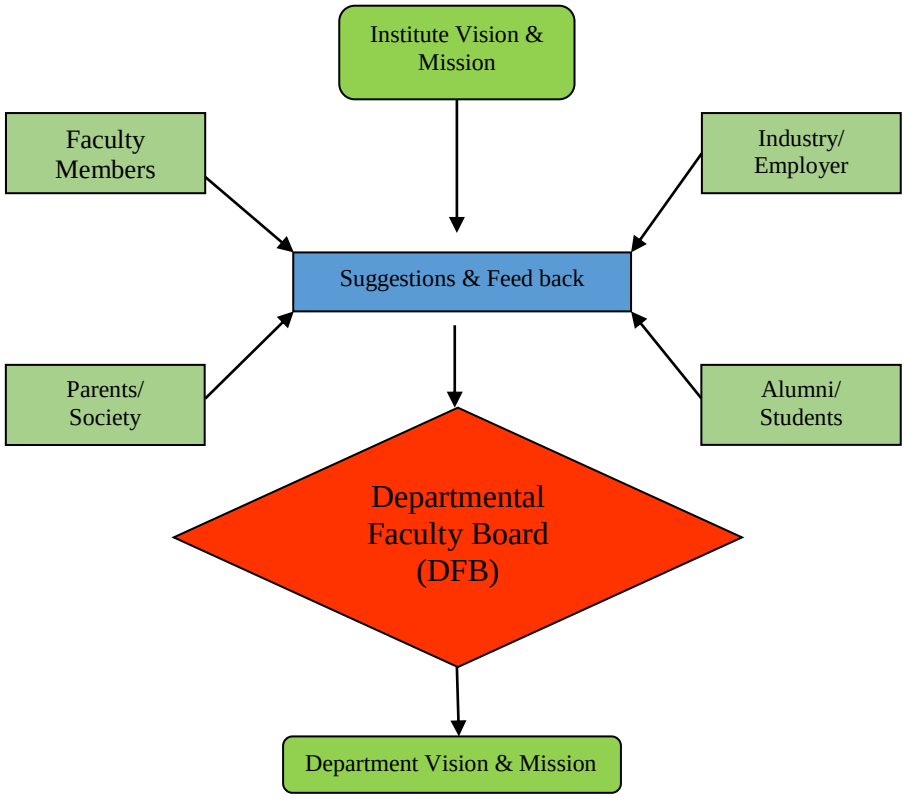


Figure B.1.4a: Process of Establishing Vision and Mission of the Department

Process for establishing PEOs

For defining the Program Educational Objectives (PEOs) of the Department, the following steps were followed (Figure B. 1.4b):

Step 1:	*The Program Educational Objectives (PEOs) of the department were first outlined by the committee setup by the Head of the Department keeping Departmental Vision and Mission, Institute Vision and Vision and Program Outcomes in view.*
Step 2:	*Proposed Program Educational Objectives (PEOs) have been circulated among the stake holders.*
Step 3:	*Discussion on the suggestions received regarding new draft of Program Educational Objectives (PEOs) statement were modified as per feedback received by stake holders.*
Step 4:	*The modified Program Educational Objectives (PEOs) were sent to the Departmental Faculty Board (DFB) for approval.*
Step 5:	*Departmental Faculty Board (DFB) approved the PEOs under the chairmanship of Head of the Department.*

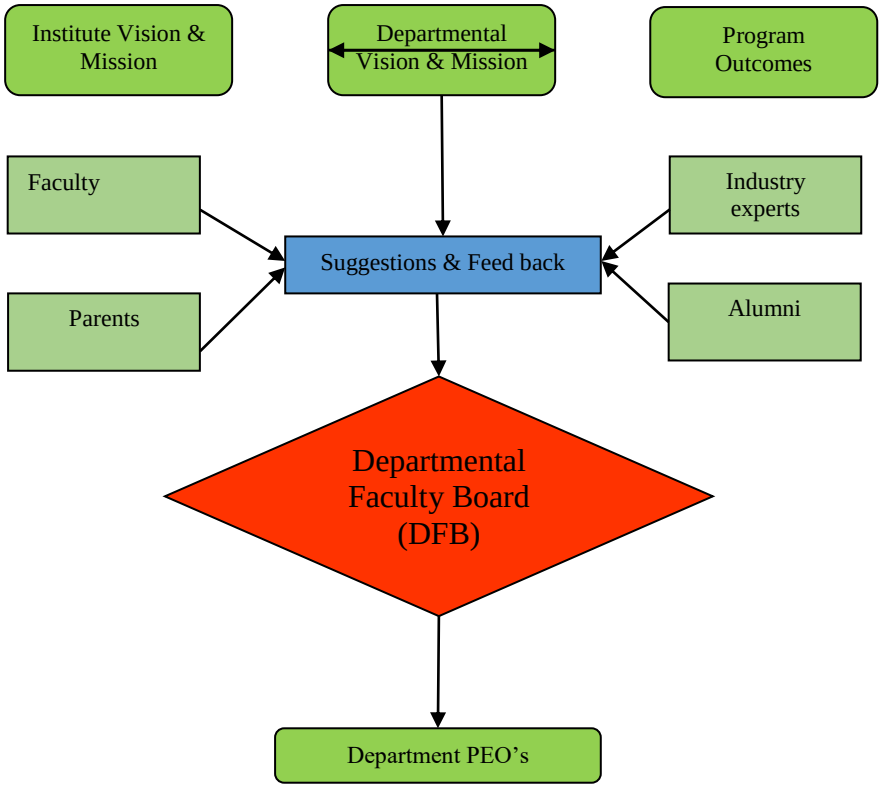


Figure B.1.4b: Process for defining the PEOs of the Department

1.5 Establish consistency of PEOs with Mission of the Department (10) Claimed 10

Mission Statements →		M1	M2	M3
PEOs Statements ↓		To create and sustain the strong foundations of Chemical Engineering education, research and innovation.	To produce well qualified, innovative Chemical Engineers with entrepreneurial skills & leadership qualities to face and solve the problems of industries and the society at large.	To make professional leaders, academicians and engineers with high moral values and ethics.
PEO1	Providing broad-based Chemical Engineering education on the solid foundations of mathematics, basic sciences, engineering and social studies by choice	**3**	**2**	**3**

	based credit system.			
PEO2	Enable the students to become future leaders in engineering practices for the overall betterment of society and instill in them a work culture based on foundations of ethics, scientific temperament and team work.	**2**	**2**	**3**
PEO3	Equip the students with knowledge, understanding and applications of Chemical Engineering tools for enabling them to pursue innovative research.	**3**	**2**	**2**
PEO4	Attain excellence in engineering and design through education in the principles and practices of Chemical Engineering.	**3**	**2**	**2**

Table B.1.5

1: Slightly related **2:** Moderately related **3:** Substantially related

Justification:

J1:

1. **PEO1- M1:** Strong foundation of chemical engineering will be achieved through the basic knowledge of science
2. **PEO1- M2:** Problem solving skills will be developed by enriching the concepts of chemical engineering
3. **PEO1- M3:** Sound foundation promotes advance education

J2:

1. **PEO2- M1:** To carry out research for the betterment of society, the knowledge of basic chemical engineering is a must
2. **PEO2- M2:** Successful entrepreneurs will be produced by maintaining balance between scientific temperament and leadership skills.
3. **PEO2- M3:** Quality education and constructive environment are pre-requisites for higher education with moral values

J3:

1. **PEO3- M1:** Basic knowledge of chemical engineering will be applied for innovations
2. **PEO3- M2:** The industrial product quality will be improved through ignition of scientific temperament
3. **PEO3- M3:** Constructive environment translates students into excellent technocrats

J4:

1. **PEO4- M1:** Sound foundation is key to develop design skills
2. **PEO4- M2:** Quality education leads to better decision making and problem solving
3. **PEO4- M3:** Attaining excellence in chemical engineering principles and practices produces best engineers for society

1.5.1 Program Outcomes (PO), Program Specific Outcomes and their mapping with identified PEOs

PEO'S → / PO'S & PSOs ↓	**PEO1:** Providing broad-based Chemical Engineering education on the solid foundations of mathematics, basic sciences, engineering and social studies by choice based credit system.	**PEO2:** Enable the students to become future leaders in engineering practices for the overall betterment of society and instill in them a work culture based on foundations of ethics, scientific temperament and team work.	**PEO3:** Equip the students with knowledge, understanding and applications of Chemical Engineering tools for enabling them to pursue innovative research.	**PEO4:** Attain excellence in engineering and design through education in the principles and practices of Chemical Engineering.
PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering Problems.	**3**	**3**	**2**	**3**
PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.	**3**	**3**	**3**	**3**
PO3. Design/Development of Solutions: Design solutions for complex	**3**	**3**	**2**	**3**

engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.				
PO4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.	**3**	**3**	**3**	**2**
PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	**3**	**2**	**2**	**2**
PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	**2**	**2**	**2**	**2**
PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	**2**	**2**	**2**	**2**
PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	**2**	**3**	**2**	
PO9. Individual and Team		**3**	**3**	

Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.				
PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	**2**	**2**	**3**	**3**
PO11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.		**3**	**3**	
PO12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.	**3**	**3**	**3**	**3**
PSO1. Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.	**3**	**3**	**3**	**3**
PSO2. Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal	**2**	**3**	**3**	**2**

contexts.				
PSO3. Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.	**3**	**2**	**3**	**3**

Table B.1.5.1

1: Slightly related **2:** Moderately related **3:** Substantially related

CRITERION 2	Program Curriculum and Teaching-Learning Processes	100
	Marks Claimed	95

2.1. Program Curriculum (30) Claimed 30

2.1.1. State the process for designing the program curriculum (10) Claimed 10

The program curriculum for Chemical Engineering is designed based on the broad guidelines of the Institute keeping in view the curriculums developed in other National Institutes of Technology (NIT), Ministry of Human Resources and Development (MHRD) directives and program specific criteria to meet the requirements of Program Outcomes (POs) and Program Educational Objectives (PEOs) of the Department. Industry persons, alumni and students are consulted at the time of designing the curriculum to update and rectify any gaps in the curriculum structure. To strengthen the teaching and learning process, curriculum is modified for every three years by introducing contemporary emerging areas of chemical engineering. Department Undergraduate Committee (DUGC) is formulated once in every three years with the Head of the Department (HOD) as the Chairman and a faculty from the department will be nominated by the HOD as Convener. All faculty members, one senior faculty member from the sister department, two working alumni and class representatives of all semesters are members of DUGC. The committee collects feedback, suggestions, and modifications, if any, from stakeholders and submits the same to the course instructor to prepare curriculum. The course contents of individual courses are discussed specifically for their outcomes in Department Undergraduate Committee (DUGC) meetings. The course instructors prepare and submit a tentative draft after thorough study of the report given by DUGC. The committee analyses and evaluates all the issues mentioned in the draft related to feedback and direct the instructor to draft a curriculum aligned with PEOs, POs and PSOs. The next step involves sending the DUGC approved draft by the chairman to the Program Assessment Committee (PAC) for their comments. The PAC is chaired by the HOD and senior faculties of the department are members. The curriculum is subjected to evaluation in the PAC so that the contents fulfill all the statutory requirements, else it is again returned for review. Redrafting the curriculum is made on the basis of valuable comments into consideration; the final draft is ready for the Senate Undergraduate Committee's (SUGC) approval. Considering all the comments and after a final review, the

modified syllabus is put forward by the SUGC for the Senate approval which is the highest academic body of the institute. The senate of NIT Srinagar is chaired by the Director and comprises of members drawn from various departments of the institute as well as from outside the institute. At least one member is an alumni and others are from other institutes of repute. The presence of outsiders and alumni ensure that the curriculum is designed keeping in view the inputs of alumni and faculty from other institutes. The process for designing the program curriculum is illustrated in Figure B.2.1a.

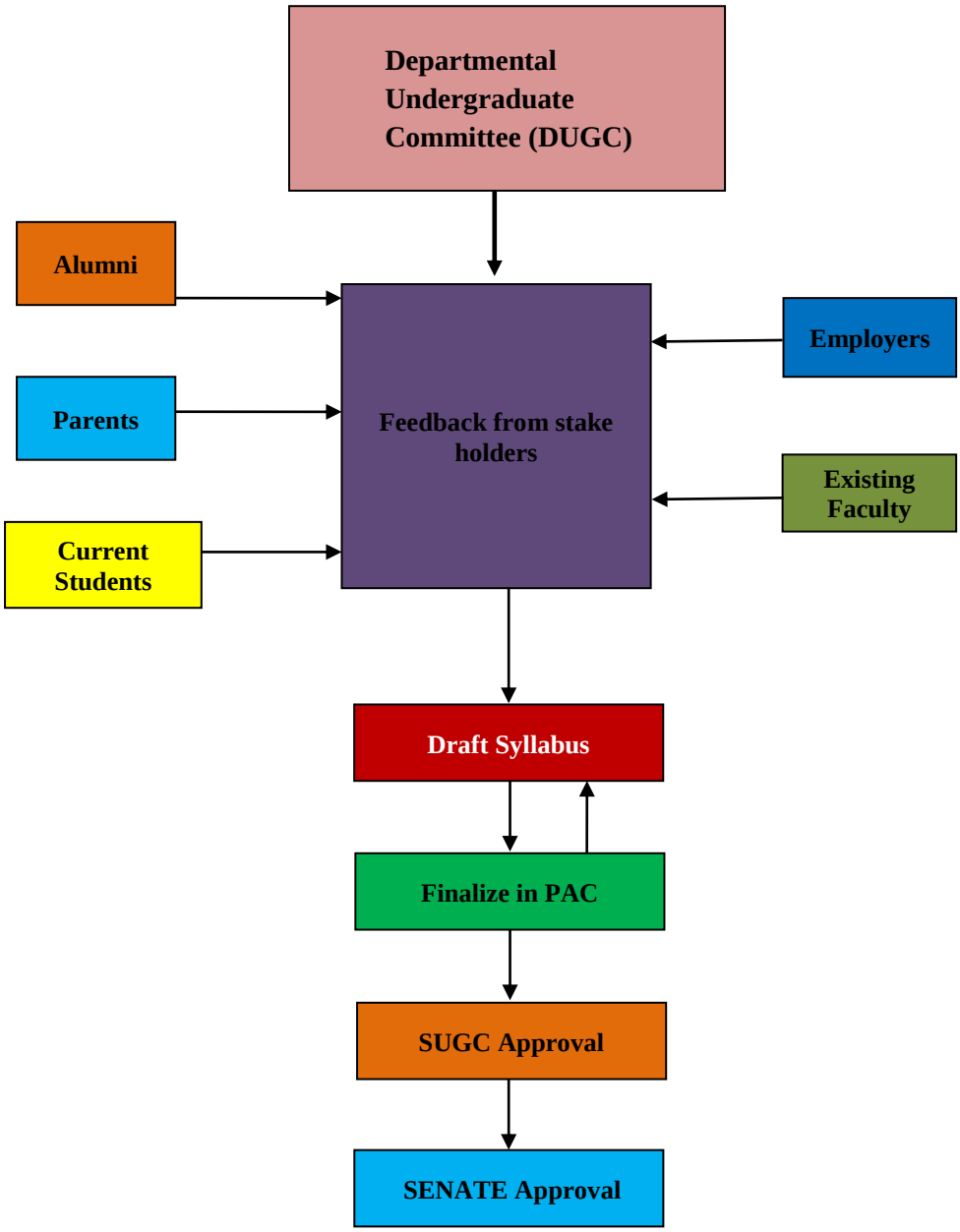


Figure B.2.1a: Process of designing the program curriculum

Process to Identify Gaps in the Curriculum

1. **Alumni Survey**

- Measures the degree to which past students believes they achieved program level learning outcomes.
- Overall satisfaction with the program.
- Overall satisfaction with the program delivery.
- Information on current professional or academic status. Typically collected every three-four years

2. **Industry/Employers Survey**

- Provides general information on current industry trends.
- Desirable graduate attributes.
- Overall perceptions of program quality. Strengths and expectations of graduates.

3. **In Program Students Survey**

- Measures the degree to which current students believe they are achieving Program-level learning outcomes.
- Overall satisfaction with the program.

4. **Existing Students Survey**

- Measures quality of the program and satisfaction with curriculum.
- An overall program delivery.

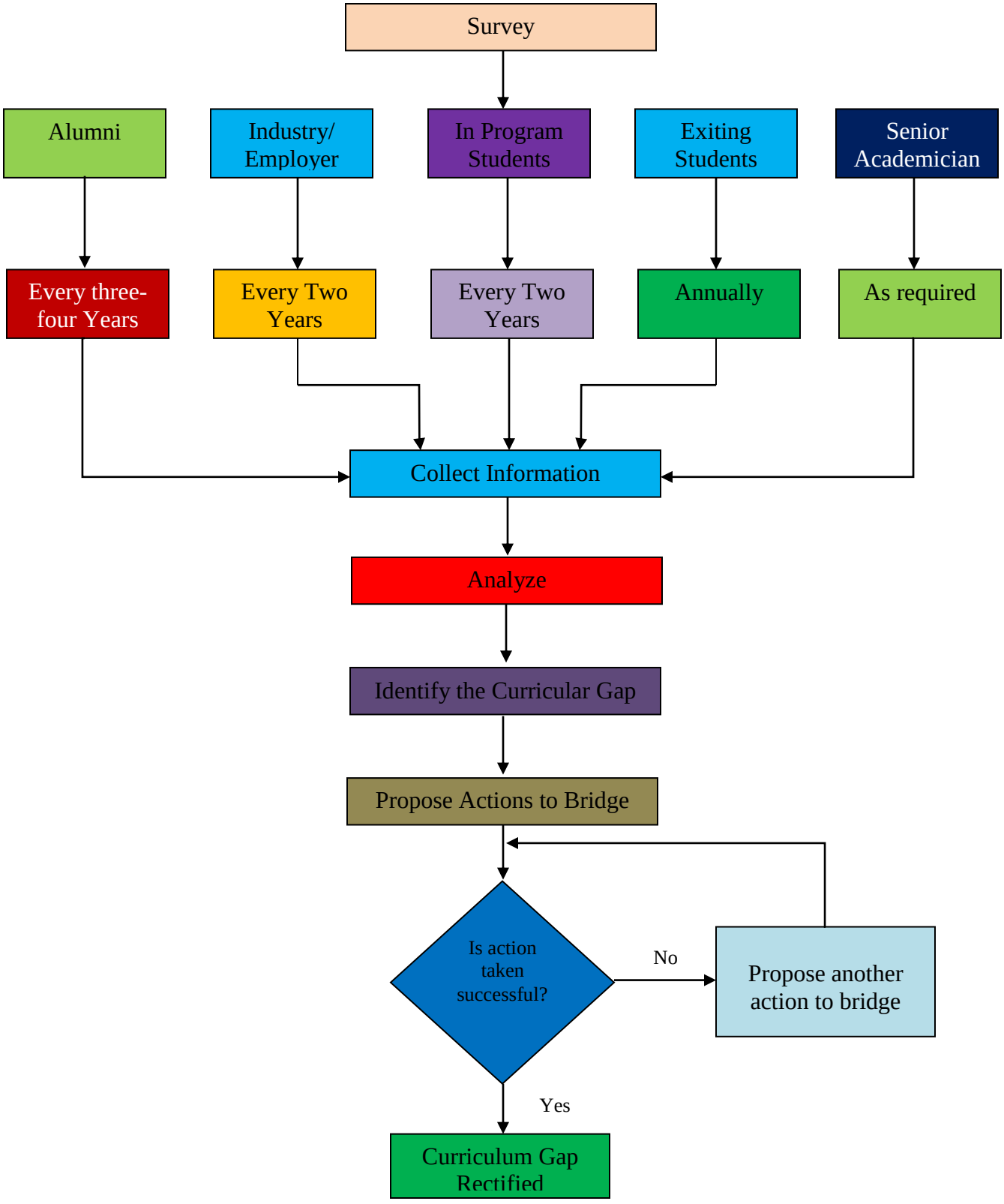


Figure B.2.1b: Process to identify the Curricular Gaps through Survey

ALUMNI SURVEY

Chemical Engineering Department
National Institute of Technology Srinagar
Alumni Survey Form

Thank you for taking the time to fill out this questionnaire. All the information will be kept confidential and will be used only for statistical purposes.

Alumni name		
Year of Graduation		
Mailing address		
Placement	**Before/after graduation**	**Core/Software**
Name of the Company		

Please rate each of the following skills, abilities or attributes in terms of their importance to state how well your education at **Chemical Engineering Department, National Institute of Technology, Srinagar** prepare you for these.

Skills, Abilities and Attributes	**Scale (1 to 5) Excellent to poor**
Apply Knowledge of mathematics, Basic sciences and Engineering	
Problem Identification and Analysis	
Design a system and develop solution to the problem	
Investigate and handle complex problems	
Ability to use techniques and tools in engineering practice	
Understand and appreciate the impact of engineering in the societal and global contexts	
Awareness of existing issues (e.g. Economics of engineering, Environmental issues)	
Understand professional and ethical responsibilities as an engineer (e.g., safety, professional ethics, code of conduct)	
Function effectively in teams	
Proficient in English language in both communicative and technical forms	
Awareness of the need for life-long learning (Seeking further education, self-learning, Membership in professional societies)	
Project Management and Finance	
Ability to apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc	
Apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts	
Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques	

Signature	**Suggestion if any:**

EMPLOYER SURVEY

Chemical Engineering Department
National Institute of Technology, Srinagar
Employer Survey Form

The purpose of this survey is to obtain Employer's input on the quality of education of undergraduate programs in NIT, Srinagar. Your sincere cooperation would enable us to improve the quality of our graduates as per your requirements

Name of Company/ Organization			
Mailing address			
Sector Private/Public/Academia			
What are the pertinent employability skills to stay updated in current industry trends and thereby improve the quality of the undergraduate program?	Logical Thinking	Good Aptitude	Excellent Communication

Rate NIT Srinagar Graduates working in your organization using the following criterion.
Put tick mark Knowledge, Skills, Abilities, Attitude and other Attributes expected out of NIT Srinagar graduates.

Sl. No.	**Overall, are you satisfied with**	**Excellent (3)**	**Good (2)**	**Satisfied(1)**
i.	Capacity for development and analysis of engineering problems and formulation of appropriate solutions, retaining professional and ethical responsibilities.			
ii.	Aptitude for self-education, ability to learn new skills and a clear appreciation for the value of life-long learning to update professional knowledge.			
iii.	Understanding professional engineering solutions for sustainable development and their application in global, national and societal contexts.			
iv.	Competence for acquiring new skills and applying them in research and development.			
v.	Fundamental knowledge in mathematics and science and professional fluency in English both communicative and technical forms.			
vi.	Dexterity in differentiation of management techniques and possession of leadership skills that enable successful function of multi-disciplinary teams.			
Name and Designation:		**Signature:**		

IN PROGRAM STUDENTS SURVEY

National Institute of Technology, Srinagar **Chemical Engineering Department** **In-Program Student Survey Form**			
Name:		**Year Passed out:**	
Email:		**Phone**	
Assessment of Knowledge, Skills, Abilities and Attributes presently acquired at NIT Srinagar			
Please rate each of the following Knowledge, Skills, Abilities, Attitudes or attribute in terms how well NIT Srinagar inculcated them in your education so far. (tick mark the your choice)			
i.	Ability to acquire and apply knowledge of basic mathematics, science and engineering fundamentals. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
ii.	Ability to apply analytical skills to engineering problems. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
iii.	Ability to conduct experiments, analyze data, and present results. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
iv.	Ability to conduct independent research for information required in engineering problem Solving. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
v.	Ability to use modern technologies and tools necessary for practice. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
vi.	Ability to understand global issues related to engineering. If not satisfied give your suggestions to improve.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
vii.	Understand the importance of ethical and professional responsibility. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
viii.	An ability to function on multi-disciplinary teams. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
ix.	An ability to communicate effectively. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
x.	A recognition of the need for, and an ability to engage in life-long learning. If not satisfied give your suggestions to improve		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

EXITING STUDENTS SURVEY

Chemical Engineering Department **National Institute of Technology, Srinagar** **Exiting Students Survey Form**			
Name:		Enrollment. No:	
Phone No.		Email:	
Assessment of Abilities, Skills and Attributes acquired at NIT Srinagar. Please rate each of the following items in terms how well your education at NIT Srinagar prepared you for them.			
1.	Basic knowledge in mathematics, science, engineering and humanities.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
2.	Ability to identify, analyse and solve chemical engineering problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
3.	Ability to design and develop solutions for chemical engineering problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
4.	Ability to investigate the complex chemical engineering problems and their solutions		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
5.	Use of research-based knowledge and research methods		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
6	Demonstrate the ability to apply advanced technologies to solve contemporary and new problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
7.	Understanding professional engineering solutions in societal and environmental contexts		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
8.	Understanding of professional and ethical responsibility		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
9.	Ability to function as an effective member in multi-disciplinary teams		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
10.	Proficient in English language in both communicative and technical forms		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
11.	Demonstrate the ability to choose and apply appropriate resource management techniques		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
12.	Capable of self-education and clearly understand the value of updating their		

	professional knowledge to engage in life-long learning		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
13.	Ability to apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
14.	Ability to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
15.	Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

1. Please list some very important skills that you think you had learned in the engineering program.

2. Please write down any comments or suggestions that you think will improve the engineering programs at NIT Srinagar.

3. Please comment about the department Vision and Mission:

2.1.2. Describe the structure of the curriculum (5)

Claimed 5

The syllabi format includes:

- Department, course code, and title of course.
- Designation as a required or elective course.
- Contact hours and type of course (lecture, tutorial, seminar, project etc.).
- Text books, and/or reference material.

The syllabus finalized by the Chemical Engineering Department during the years 2014 onwards.

1st Semester						
Course Code	**Course Title**	**(L)**	**(T)**	**(P)**	**Total Hours**	**Credits**
CHM-101	Chemistry-I	4	0	0	4	4
PHY-101	Physics-I	3	0	0	3	3
MTH-101	Mathematics-I	3	1	0	4	4
HSS-101	Communication Skills & Oral Presentation	3	1	0	4	4
IT-101	Computer Fundamentals And Problem Solving Techniques	3	0	0	3	3
CIV-102	Engineering Drawing	1	0	3	4	4
CHM-101 P	Chemistry-I Lab	0	0	2	2	1
PHY-102 P	Physics-I Lab	0	0	2	2	1
IT-102P	Computer Fundamentals And Problem Solving Techniques Lab	0	0	2	2	1
WSP-I	Workshop Practices- I	1	0	3	4	2
	Total	18	2	12	32	27
2nd Semester						
CHM-201	Chemistry-II	3	1	0	4	4
PHY-201	Physics- II	3	0	0	3	3
MTH-201	Mathematics-II	3	1	0	4	4
HSS-201	Introduction To Social Sciences	3	1	0	4	4
CSE-201	C Programming	3	0	0	3	3
CIV-201	Strength of Materials	3	1	0	4	4
MED-201	Machine Drawing	1	0	2	3	3
CHM-201 P	Chemistry-II Lab	0	0	2	2	1
PHY-201 P	Physics-II Lab	0	0	2	2	1
CSE-202 P	Computer Programming Lab	0	0	2	2	1
WSP-II	Workshop Practices-II	1	0	3	4	2
	Total	20	4	11	35	30

3rd Semester						
ChBC-31	Introduction to Chemical Eng.	3	1	0	4	4
ChBC-32	Material and Energy Balance	3	2	0	5	5
ChBC-33	Process Fluid Mechanics	3	1	0	4	4
ChBC-34	Thermodynamics and Chemical Kinetics	3	1	0	4	4
EEBC-31	Basic Electrical Eng.	2	1	0	3	3
EEBC-32P	Basic Electrical Eng. Lab	0	0	2	2	1
MTBC-31	Chemical Eng. Mathematics-I	3	1	0	4	4
	Total= 17+7+2=26	17	7	2	26	25
4th Semester						
ChBC-41	Chemical Eng. Thermodynamics	3	1	0	4	4
ChBC-42	Heat Transfer	3	1	0	4	4
ECEBC-41	Basic Electronics Eng.	2	1	0	3	3
ECEBC-42P	Basic Electronics Eng. Lab.	0	0	2	2	1
ChBC-43	Mechanical Operations	3	1	0	4	4
ChBC-44P	Fluid Mechanics & Mechanical Operations Lab	0	0	4	4	2
ChBS-41	Seminar	0	0	4	4	2
HSBC-41	Ethics and Self Awareness	2	0	0	2	2
MTBC-41	Chemical Eng. Mathematics –II	3	0	0	3	3
	Total=16+4+10=30	16	4	10	30	25
5th Semester						
ChBC-51	Process Equipment Design –I (Mechanical Aspects)	3	0	2	5	4
ChBC-52	Chemical Reaction Engineering	3	2	0	5	5
ChBC-53	Material Science & Technology	3	1	0	4	4
ChBC-54	Chemical Technology-I	3	0	0	3	3
ChBC-55	Mass Transfer-I	3	1	0	4	4
ChBC-56P	Heat Transfer Lab.	0	0	4	4	2
HSBC-51	Basic Management Principles	3	0	0	3	3
	Total=18+4+6=28	18	4	6	28	25
6th Semester						
ChBC-61	Process Equipment Design-II (Process Aspect)	3	0	2	5	4
ChBC-62	Mass Transfer-II	3	1	0	4	4
ChBC-63	Chemical Technology-II	3	0	0	3	3
ChBC-64	Energy Eng.	3	0	0	3	3
ChBC-65P	Energy Eng. Lab.	0	0	2	2	1
ChBC-66	Process Instrumentation	3	0	0	3	3

ChBC-67	Transport Phenomenon	3	1	0	4	4
ChBC-68P	Thermodynamics & Reaction Engineering Lab.	0	0	2	2	1
ChBC-69	Industrial Training & Presentation	0	0	4	4	2
Total=18+2+10=30		18	2	10	30	25
7th Semester						
ChBP-71	Pre-project Work	0	0	4	4	2
ChBC-72	Chemical Process Safety	3	0	0	3	3
ChBC-73	Process Dynamics & Control	3	1	0	4	4
ChBC-74P	Process Dynamics & Control Lab.	0	0	2	2	1
ChBC-75	Process Economics & Plant Design	3	1	0	4	4
ChBC-76	Biochemical Eng.	3	1	0	4	4
ChBC-77P	Mass Transfer Lab.	0	0	2	2	1
E-I	Elective-I	3	0	0	3	3
E-II	Elective-II	3	0	0	3	3
Total=18+3+8=29		18	3	8	29	25
8th Semester						
ChBP-81	Project	0	0	16	16	8
ChBC-82	Bioresource Technology	3	0	0	3	3
ChBC-83P	Biochemical Engineering Lab.	0	0	2	4	2
ChBC-84	Modeling & Simulation in Chemical Eng.	3	0	0	3	3
ChBC-85	Industrial Pollution Abatement	3	0	0	3	3
E-III	Elective-III	3	0	0	3	3
E-IV	Elective-IV	3	0	0	3	3
Total=15+0+20=35		15	0	20	35	25

Table B.2.1.2a: Course Structure for B.Tech Chemical Engineering-2014 Batch onwards

L: Lecture, P: Practical, T: Tutorial

7th Semester (E-I)		
S.No.	Elective	Code
1.	Polymer Sciences and Engineering	ChBE-71
2.	Petrochemical Technology	ChBE-72
3.	Advanced Separation Processes	ChBE-73
4.	Operation Research	MTBE-71
5.	Human Resource Development	HSBE-71
7th Semester (E-II)		
1.	Computational Fluid Dynamics	ChBE-74

2.	Multi Component Distillation	ChBE-75
3.	Optimization Techniques in Chemical Eng.	ChBE-76
4.	Managerial Economics for Engineers	HSBE-72
	8th Semester (E-III)	
1.	Instrumental Methods of Analysis	ChBE-81
2.	Petroleum Refining	ChBE-82
3.	Food Technology	ChBE-83
4.	Nano-Science and Technology	ChBE-84
	8th Semester (E-IV)	
1.	Process Heat Integration	ChBE-85
2.	Fuel Cell Technology	ChBE-86
3.	Clean Technology in Process Industries	ChBE-87
4.	Entrepreneurship Development	HSBE-81

Table B.2.1.2b: Electives 2014 Batch onwards

The syllabus finalized by the Chemical Engineering Department during the years 2017 onwards.

1st Semester						
Course Code	**Course Title**	**(L)**	**(T)**	**(P)**	**Total Hours**	**Credits**
CHM-101	Chemistry-I	4	0	0	4	4
PHY-101	Physics-I	3	0	0	3	3
MTH-101	Mathematics-I	3	1	0	4	4
HSS-101	Communication Skills & Oral Presentation	3	1	0	4	4
IT-101	Computer Fundamentals And Problem Solving Techniques	3	0	0	3	3
CIV-102	Engineering Drawing	1	0	3	4	4
CHM-101 P	Chemistry-I Lab	0	0	2	2	1
PHY-102 P	Physics-I Lab	0	0	2	2	1
IT-102P	Computer Fundamentals And Problem Solving Techniques Lab	0	0	2	2	1
WSP-I	Workshop Practices- I	1	0	3	4	2
	Total	18	2	12	32	27
2nd Semester						
CHM-201	Chemistry-II	3	1	0	4	4
PHY-201	Physics- II	3	0	0	3	3
MTH-201	Mathematics-II	3	1	0	4	4
HSS-201	Introduction To Social Sciences	3	1	0	4	4
CSE-201	C Programming	3	0	0	3	3
CIV-201	Strength of Materials	3	1	0	4	4
MED-201	Machine Drawing	1	0	2	3	3

CHM-201 P	Chemistry-II Lab	0	0	2	2	1
PHY-201 P	Physics-II Lab	0	0	2	2	1
CSE-202 P	Computer Programming Lab	0	0	2	2	1
WSP-II	Workshop Practices-II	1	0	3	4	2
	Total	20	4	11	35	30
3rd Semester						
ChBC-31	Introduction to Chemical Eng.	3	1	0	4	4
ChBC-32	Material and Energy Balance	3	1	0	4	5
ChBC-33	Process Fluid Mechanics	3	1	0	4	4
ChBC-34	Thermodynamics and Chemical Kinetics	3	1	0	4	4
EEBC-31	Basic Electrical & Electronics Eng.	3	1	0	4	4
HSBC-31	Ethics and Self Awareness	2	0	0	2	2
MTBC-31	Chemical Eng. Mathematics-I	2	1	0	3	3
	Total= 19+6=25	19	6	0	25	25
4th Semester						
ChBC-41	Chemical Eng. Thermodynamics	3	1	0	4	4
ChBC-42	Heat Transfer	3	1	0	4	4
ChBC-43	Mechanical Operations	3	1	0	4	4
ChBC-44P	Fluid Mechanics & Mechanical Operations Lab	0	0	4	3	2
ChBC-45	Mass Transfer-I	3	1	0	4	4
ChBS-41	Seminar	0	0	4	4	2
EEBC-41P	Basic Electrical & Electronics Eng. Lab	0	0	4	4	2
MTBC-41	Chemical Eng. Mathematics –II	2	1	0	3	3
	Total=14+5+12=29	14	5	12	30	25
5th Semester						
ChBC-51	Process Equipment Design –I (Mechanical Aspects)	3	0	2	5	4
ChBC-52	Chemical Reaction Engineering	3	2	0	5	5
ChBC-53	Material Science & Technology	3	1	0	4	4
ChBC-54	Chemical Technology-I	3	0	0	3	3
ChBC-55P	Heat Transfer Lab.	0	0	4	4	2
HSBC-51	Basic Management Principles	3	0	0	3	3
MTBC-51	Numerical Methods	3	1	0	4	4
	Total=18+4+6=28	18	4	6	28	25
6th Semester						
ChBC-61	Process Equipment Design-II (Process Aspect)	3	0	2	5	4

ChBC-62	Mass Transfer-II	3	1	0	4	4
ChBC-63	Chemical Technology-II	3	0	0	3	3
ChBC-64	Energy Eng.	3	0	0	3	3
ChBC-65P	Energy Eng. Lab.	0	0	2	2	1
ChBC-66	Process Instrumentation	3	0	0	3	3
ChBC-67	Transport Phenomenon	3	1	0	4	4
ChBC-68P	Thermodynamics & Reaction Engineering Lab.	0	0	2	2	1
ChBC-69	Industrial Training &Presentations	0	0	4	4	2
	Total=18+2+10=30	18	2	10	30	25
7th Semester						
ChBP-71	Pre-project Work	0	0	4	4	2
ChBC-72	Chemical Process Safety	3	0	0	3	3
ChBC-73	Process Dynamics & Control	3	1	0	4	4
ChBC-74P	Process Dynamics & Control Lab.	0	0	2	2	1
ChBC-75	Process Economics & Plant Design	3	1	0	4	4
ChBC-76	Biochemical Eng.	3	1	0	4	4
ChBC-77P	Mass Transfer Lab.	0	0	2	2	1
E-I	Elective-I	3	0	0	3	3
E-II	Elective-II	3	0	0	3	3
	Total=18+3+8=29	18	3	8	29	25
8th Semester						
ChBP-81	Project	0	0	16	16	8
ChBC-82	Bioresource Technology	2	1	0	3	3
ChBC-83P	Biochemical Engineering Lab.	0	0	4	4	2
ChBC-84	Modeling & Simulation in Chemical Eng.	2	1	0	3	3
ChBC-85	Industrial Pollution Abatement	2	1	0	3	3
E-III	Elective-III	3	0	0	3	3
E-IV	Elective-IV	3	0	0	3	3
	Total=12+3+20=35	12	3	20	35	25

Table B.2.1.2c: Course Structure for B.Tech Chemical Engineering-2017 Batch onwards

L: Lecture, P: Practical, T: Tutorial

7th Semester (E-I)		
S.No.	Elective	Code
1.	Polymer Sciences and Engineering	ChBE-71
2.	Petrochemical Technology	ChBE-72
3.	Advanced Separation Processes	ChBE-73

4.	Operation Research	MTBE-71
5.	Human Resource Development	HSBE-71
	7th Semester (E-II)	
1.	Computational Fluid Dynamics	ChBE-74
2.	Multi Component Distillation	ChBE-75
3.	Optimization Techniques in Chemical Eng.	ChBE-76
4.	Managerial Economics for Engineers	HSBE-72
	8th Semester (E-III)	
1.	Instrumental Methods of Analysis	ChBE-81
2.	Petroleum Refining	ChBE-82
3.	Food Technology	ChBE-83
4.	Nano-Science and Technology	ChBE-84
	8th Semester (E-IV)	
1.	Process Heat Integration	ChBE-85
2.	Fuel Cell Technology	ChBE-86
3.	Clean Technology in Process Industries	ChBE-87
4.	Entrepreneurship Development	HSBE-81

Table B.2.1.2d: Electives 2017 Batch onwards

The syllabus finalized by the Chemical Engineering Department during the years 2019 onwards.

1st Semester						
Course Code	**Course Title**	**(L)**	**(T)**	**(P)**	**Total Hours**	**Credits**
MEL100	Elements of Mechanical Engg.	2	1	0	3	3
PHL100	Engineering Physics	3	1	0	4	4
CIL100	Engineering Mechanics	3	1	0	4	4
HUL100	Basic English and Communication Skills	2	1	0	3	3
CYL101	Environmental Studies	2	1	0	3	3
MAL100	Mathematics I	3	1	0	4	4
HUP100	Language Laboratory	0	0	2	2	1
PHP100	Physics Laboratory	0	0	2	2	1
WSP100	Work shop Practice	0	0	5	5	2
	Total= 15+6+9=30	15	6	9	30	25
2nd Semester						
HUL101	Advanced English Comm. Skills & Organizational Behavior	2	1	0	3	3
EEL100	Basic Electrical Engineering	3	1	0	4	4
ITL100	Computer Programming	2	1	0	3	3

CYL100	Engineering Chemistry	3	1	0	4	4
CIP100	Engineering Drawing	1	0	6	7	4
MAL101	Mathematics II	3	1	0	4	4
ELP100	Basic Electrical Engineering Laboratory	0	0	2	2	1
CYP100	Chemistry Laboratory	0	0	2	2	1
ITP100	Computer Programming Laboratory	0	0	2	2	1
	Total=14+5+12=31	14	5	12	31	25
3rd Semester						
CET-211	Introduction to Chemical Engineering	3	1	0	4	4
CET-212	Material and Energy Balance	3	1	0	4	4
CET-213	Process Fluid Mechanics	3	1	0	4	4
CET-214	Thermodynamics and Chemical Kinetics	3	1	0	4	4
ECT-215	Basic Electronics Engineering	2	1	0	3	3
HST-216	Ethics & Self Awareness	2	0	0	2	2
MTT-217	Chemical Engineering Mathematics-I	3	1	0	4	4
	Total= 19+6=25	19	6	0	25	25
4th Semester						
CET-257	Chemical Engineering Thermodynamics	2	1	0	3	3
CET-258	Heat Transfer	3	1	0	4	4
CET-259	Mechanical Operations	3	1	0	4	4
CEL-260	Fluid Mechanics & Mechanical Operations Lab.	0	0	4	4	2
CET-261	Material Science & Technology	3	1	0	4	4
CET-262	Process Instrumentation	3	0	0	3	3
ECL-263	Basic Electronics Engineering Lab.	0	0	2	2	1
MTT-264	Chemical Engineering Mathematics – II	3	1	0	4	4
	Total=17+5+6=28	17	5	6	28	25
5th Semester						
CET-305	Process Equipment Design– I	3	1	0	4	4
CET-306	Chemical Reaction Engineering	3	2	0	5	5
CET-307	Mass Transfer-I	3	1	0	4	4
CET-308	Chemical Technology – I	3	0	0	3	3
HST-309	Basic Management Principles	3	0	0	3	3
MAT-310	Numerical Methods	3	1	0	4	4
CEL-311	Heat Transfer Lab	0	0	2	2	1

CEL-312	Computer Simulation Lab	0	0	2	2	1
	Total=18+5+4=27	18	5	4	27	25
6th Semester						
CET-355	Process Equipment Design -II	3	1	0	4	4
CET-356	Mass Transfer – II	3	1	0	4	4
CET-357	Chemical Technology – II	3	0	0	3	3
CET-358	Energy Technology	3	0	0	3	3
CET-359	Chemical Process Safety	3	0	0	3	3
CET-360	Transport Phenomena	3	1	0	4	4
CEL-361	Energy Technology Lab	0	0	2	2	1
CEL-362	Thermodynamics & Reaction Engineering Lab	0	0	2	2	1
CEI-363	Industrial Training & Presentation	0	0	4	4	2
	Total=18+3+8=29	18	3	8	29	25
7th Semester						
CEP-413	Pre-project work	0	0	4	4	2
CES-414	Seminar	0	0	4	4	2
CET-415	Process Dynamics & Control	3	1	0	4	4
CET-416	Process Economics & Plant Design	3	1	0	4	4
CET-417	Biochemical Engineering	3	1	0	4	4
CEL-418	Process Dynamics & Control Lab	0	0	2	2	1
CEL-419	Mass Transfer Lab	0	0	4	4	2
CET-020-24	Elective – I	3	0	0	3	3
CET-025-29	Elective – II	3	0	0	3	3
	Total=15+3+14=32	15	3	14	32	25
8th Semester						
CEP-464	Project Work	0	0	16	16	8
CET-465	Bioresource Technology	3	0	0	3	3
CEL-466	Biochemical Engineering Lab	0	0	4	4	2
CET-467	Modeling & Simulation of Chemical Process Systems	3	0	0	3	3
CET-468	Industrial Pollution Abatement	3	0	0	3	3
CET-069-72	Elective – III	3	0	0	3	3
CET-073-76	Elective – IV	3	0	0	3	3
	Total=12+3+20=35	15	0	20	35	25

Table B.2.1.2e: Course Structure for B.Tech Chemical Engineering-2019 Batch onwards

L: Lecture, P: Practical, T: Tutorial

SNo.	Elective	Code
	7th Semester (E-I)	
1.	Polymer Science and Engineering	CET-020
2.	Managerial Economics for Engineers	HST-021
3.	Advanced Separation Processes	CET-022
4.	Operations Research	MAT-023
5.	Process Heat Integration	CET-024
	7th Semester (E-II)	
1.	Cement Technology	CET-025
2.	Computational Fluid Dynamics	CET-026
3.	Multi-component Distillation	CET-027
4.	Optimization Techniques in Chemical Engineering	CET-028
5.	Heterogeneous Catalysis & Catalytic Processes	CET-029
	8th Semester (E-III)	
1.	SWAYAM Online course	CET-069
2.	SWAYAM Online course	CET-070
3.	SWAYAM Online course	CET-071
	8th Semester (E-IV)	
4.	SWAYAM Online course	CET-072
1.	SWAYAM Online course	CET-073
2.	SWAYAM Online course	CET-074
3.	SWAYAM Online course	CET-075
4.	SWAYAM Online course	CET-076

Table B.2.1.2f: Electives 2019 Batch onwards (Proposed)

Improved Curriculum

In view of the gaps identified following changes were made to the course curriculum:

i. "Basic Electrical Engineering" taught in 3rdsemester with LTP and credits as 2:1:0:3 for the 2014 curriculum has been renamed as "Basic Electrical & Electronics Engineering" with LTP and credits as 3:1:0:4 for the 2017 curriculum.

ii. "Basic Electrical Engineering Lab" taught in 3rd semester with LTP and credits as 0:0:2:1 for the 2014 curriculum has been shifted to 4th semester with LTP and credits as 0:0:4:2 for the 2017 curriculum.

iii. "Basic Electronics Engineering" taught in 4th semester with LTP and credits as 2:1:0:3 for the 2014 curriculum has been shifted to 3rd semester as "Basic Electrical & Electronics Engineering" with LTP and credits as 3:1:0:4 for the 2017 curriculum.

iv. "Ethics and Self Awareness" taught in 4th semester with LTP and credits as 2:0:0:2 for the 2014 curriculum has been shifted to 3rd semester for the 2017 curriculum with same LTP and credits in order to inculcate an ethical culture amongst students from an early stage in their program.

v. "Mass Transfer-I" taught in 5th semester as core course for the 2014 curriculum has been shifted to 4th semester level with same LTP so as to get core knowledge from the very beginning of the Chemical Engineering course.
vi. For 2017 batch onwards, "Numerical Analysis" taught as an elective has been shifted as a core course under the name "Numerical Methods" taught in the 5th semester. Techniques involved in latest analysis.

From the Academic Year 2019-2020 based on the gaps identified, the following changes were made to the 2019 onwards course curriculum:

i. The LTP and credits of "Chemical Engineering Thermodynamics" taught in 4thsemester with LTP and credits as 3:1:0:4 for the 2017 curriculum have been changed in 2019 curriculum. In new scheme, the LTP and credits are 2:1:0:3.
ii. "Process Instrumentation" taught in 6th semester as core course for the 2017 curriculum has been shifted to 4th semester level with same LTP and credits so as to get core knowledge from the very beginning of the Chemical Engineering course.
iii. "Material Science &Technology" taught in 5thsemester as core course for the 2017 curriculum has been shifted to 4th semester level with same LTP and credits so as to get core knowledge from the very beginning of the Chemical Engineering course.
iv. "Mass Transfer-I" taught in 4th semester with LTP and credits as 3:1:0:4 for the 2017 curriculum has been shifted to 5thsemester with same LTP and credits as 3:1:0:4 for the 2019 curriculum.
v. "Computer Simulation Lab" has been introduced as a new lab in 5thsemester with LTP and credits as 0:0:2:1 for the 2019 curriculum in order to inculcate software knowledge amongst students from an early stage in their program.
vi. "Chemical Process Safety" taught in 7thsemester as core course for the 2017 curriculum with LTP and credits as 3:0:0:3 has been shifted to 6th semester level with same LTP and credits in 2019 curriculum.
vii. "Seminar" which was kept in 4th semester with LTP and credits as 0:0:4:2 for the 2017 curriculum has been shifted to 7th semester level with same LTP and credits in 2019 curriculum.
viii. The LTP and credits of "Bioresource Technology" taught in 8th semester with LTP and credits as 2:1:0:3 for the 2017 curriculum has been changed in 2019 curriculum. In new scheme, the LTP and credits are 3:0:0:3.
ix. "Modeling and Simulation in Chemical Eng." taught in 8thsemester with LTP and credits as 2:1:0:3 for the 2017 curriculum has been renamed as "Modeling & Simulation of Chemical Process Systems"in 2019 curriculum. In new scheme, the LTP and credits are 3:0:0:3.
x. The LTP and credits of "Industrial Pollution Abatement" taught in 8thsemester with LTP and credits as 2:1:0:3 for the 2017 curriculum has been changed in 2019 curriculum. In new scheme, the LTP and credits are 3:0:0:3.

2.1.3. State the components of the curriculum (5)

Claimed 5

Programme curriculum grouping based on different components:

	Course Component	Curriculum Content (% of total number of credits of the programme)	Total number of contact hours	Total Number of credits
1	**Mathematics**	7.25	15	15
2	**Basic Science**	8.7	18	18
3	**Basic Eng. Course**	11.11	34	23
4	**Computing**	3.8	8	8
5	**Humanities and Social Science**	6.28	13	13
6	**Professional Core**	50.24	117	104
7	**Electives (Department and open)**	5.8	12	12
8	**Projects/Training/Seminar**	6.76	28	14
	Total	100	245	207

Table B.2.1.3 a: Percentage of Credits Allotted for various Courses for 2014 scheme

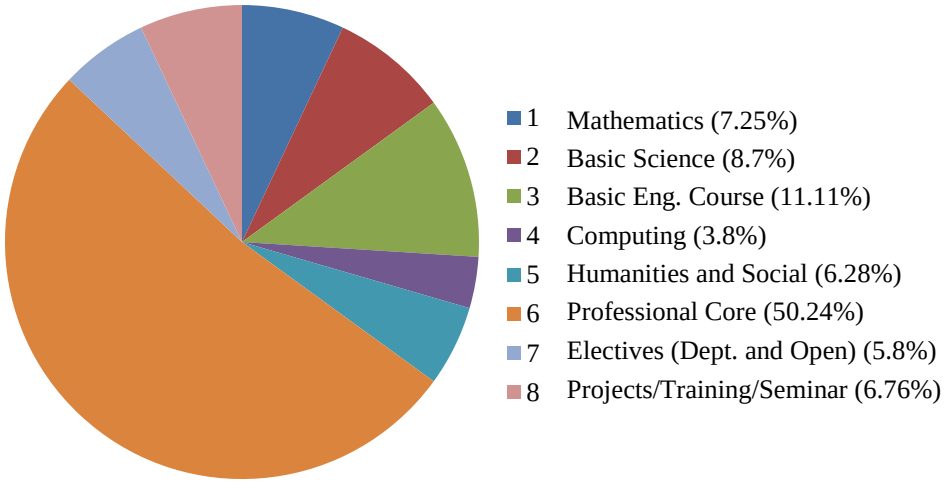


Figure B.2.1.3a: Graphical Representation of percentage of Credits Allotted for Various Courses

	Course Component	Curriculum Content (% of total number of credits of the programme)	Total number of contact hours	Total Number of credits
1	**Mathematics**	8.7	18	18
2	**Basic Science**	8.7	18	18
3	**Basic Eng. Course**	11.11	34	23
4	**Computing**	3.8	8	8
5	**Humanities and Social Science**	6.2	13	13
6	**Professional Core**	49.75	116	103
7	**Electives (Department and open)**	5.8	12	12
8	**Projects/Training/Seminar**	6.76	28	14
	Total	100	245	207

Table B.2.1.3b: Percentage of Credits Allotted for various Courses for 2017 scheme

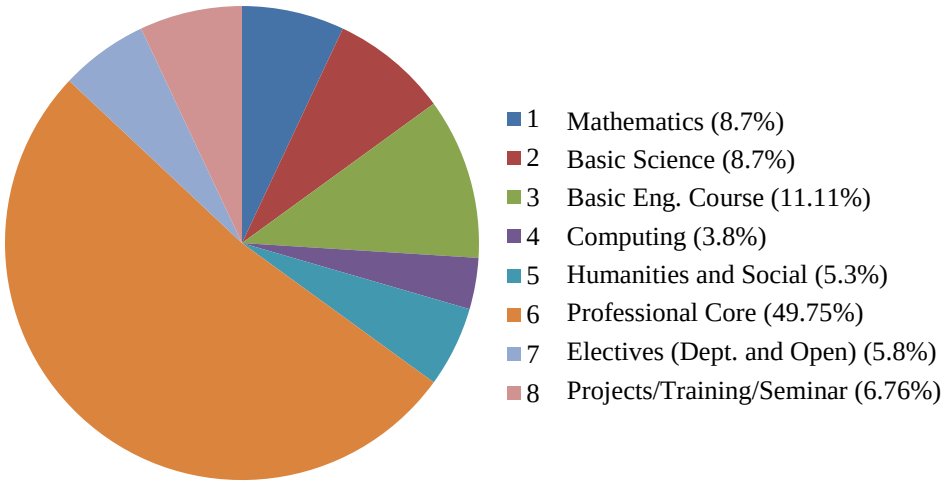


Figure B.2.1.3b: Graphical Representation of Percentage of Credits Allotted for Various Courses

Course Component		Curriculum Content (% of total number of credits of the programme)	Total number of contact hours	Total Number of credits
1	**Mathematics**	10	20	20
2	**Basic Science**	6.5	15	13
3	**Basic Eng. Course**	11	26	22
4	**Computing**	2.5	7	5
5	**Humanities and Social Science**	6	13	12
6	**Professional Core**	51	111	102
7	**Electives (Department and open)**	6	12	12
8	**Projects/Training/Seminar**	7	28	14
	Total	100	232	200

Table B.2.1.3 c: Percentage of Credits Allotted for various Courses for 2019 scheme

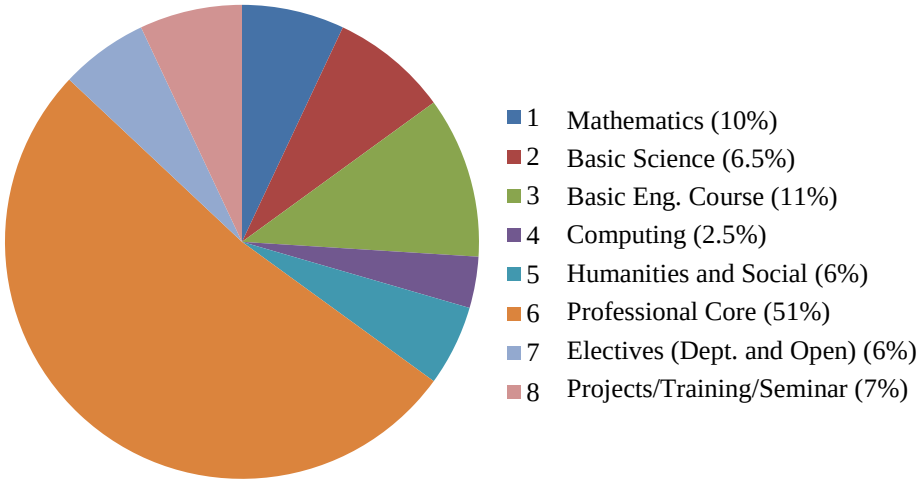


Figure B.2.1.3c: Graphical Representation Percentage of Credits Allotted for Various Courses

2.1.4 State the process used to identify extent of compliance of the curriculum for attaining the program outcomes (POs) and program specific outcomes (PSOs) (10) **Claimed 10**

The Department of Chemical Engineering has formed the Departmental Undergraduate Committee for guiding academic activities. The committee lead by Head of the Department (HOD) consists of all faculty members, representatives from the industry, alumni and the current academic session students. Broad curriculum, concept of outcome based education, programme outcomes (POs), Program Specific Outcomes (PSOs), course delivery, evaluation process, mapping etc. is discussed at par to improve as well as assess the viability of the curriculum such as to achieve excellence in teaching/learning process. This process has helped us to comply with the broad curriculum for attaining the programme outcomes. Accordingly feedback, views, expectations are collected from various stakeholders. The process of establishing POs and PSOs involve a brain storming session firstly in the departmental meetings of the faculty based on feedbacks sought from the various stake holders' thorough interactions/questionnaires/interviews/meetings. The department arrives at specific conclusions after a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis based on these interactions and considerations of requirements for developing an ideal student. The program outcomes and PSOs thus evolved, are put forth in the departmental meeting which reviews the POs and PSOs.

A. Process to identify the extent of compliance of curriculum for attainment of POs & PSOs

- POs & PSOs stated clearly.
- Department curriculum is stated subject wise and the percentage of total credits for each subject is evaluated.
- The total number of contact hours for each subject in a semester is calculated.
- Course allocation to the faculty takes place two months prior to the commencement of classes as per the faculty preference such as to prepare their pedagogical approach for the subject.
- Faculty incharge of the course prepares detailed lecture plans according to the academic calendar of the Institution, and maintains a course file comprising of all the lesson plans. The lecture plans incorporate the details of the topics to be covered in each lecture, syllabus to be covered before internal exams, number of tutorials to be conducted and, total number of lecture hours necessary for completion of the course.
- The Program Assessment Committee considers the defined mandatory graduate attributes (GAs) from the NBA guidelines, Program Educational Objectives, Vision and Mission statements of the Department and views from the stakeholders. The committee develops POs & PSOs and discusses with the senior faculty members of the Department. The developed POs & PSOs are put up in DUGC (earlier Board of Studies) meeting for review and approval. Process of defining POs and PSOs is depicted in the flowchart as shown in Figure B.2.1.4a.

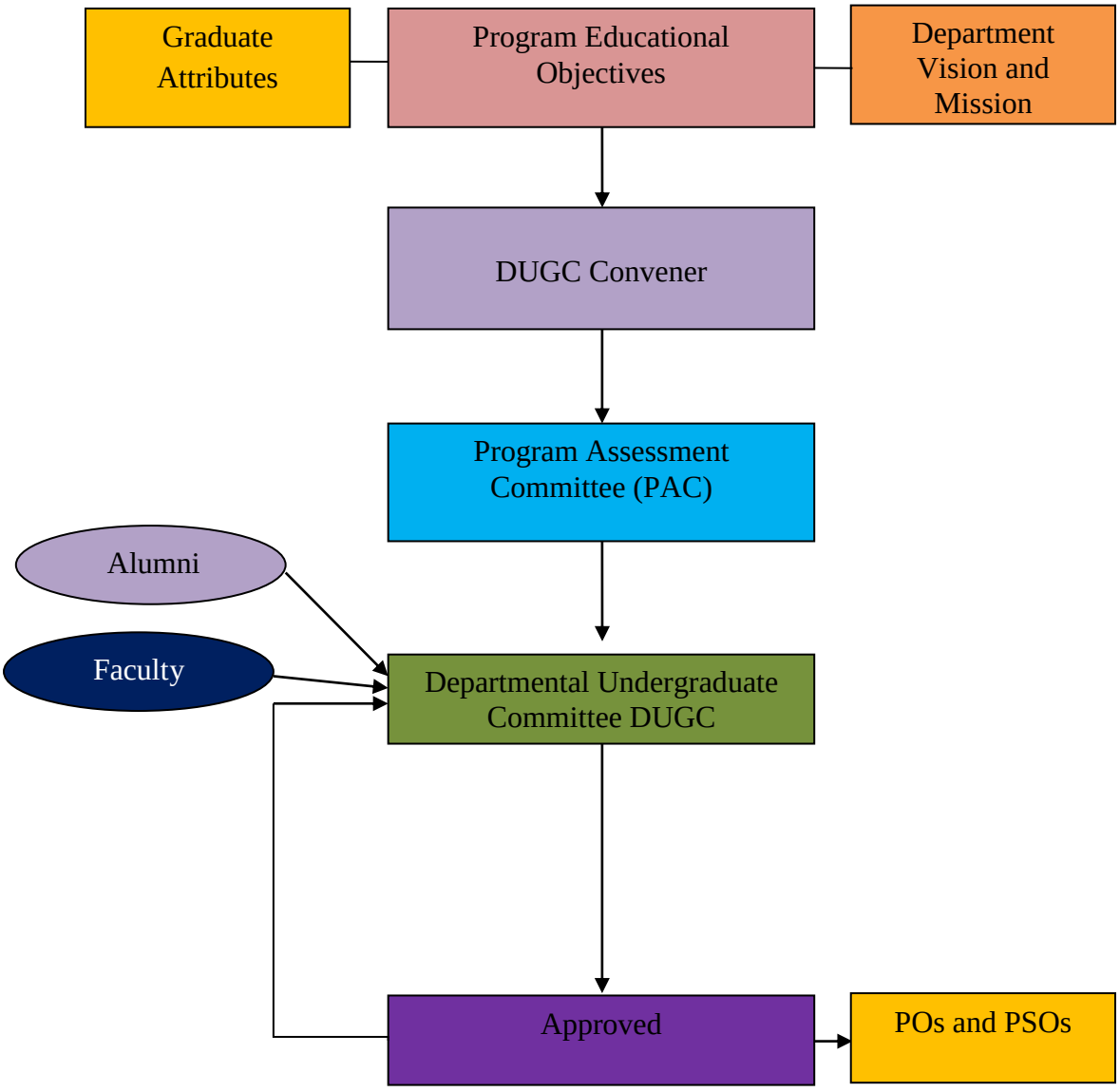


Figure B.2.1.4a: Procedure for Defining Program Outcomes and Program Specific Outcomes

B. Program Outcomes (POs)

PO 1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO 3. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs

with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.

PO 5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

C. Program Specific Outcomes (PSOs)

The Chemical Engineering graduates will be able to:

PSO 1. Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.

PSO 2. Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in Chemical and Allied disciplines in the societal contexts.

PSO 3. Design, develop and modify the Chemical Processes and to analyze these by applying the physicochemical and biological techniques.

D. Course Outcomes (COs)

Course Outcomes are statements of what a student should be able to demonstrate upon the completion of a course. They are assessable and measurable knowledge, skill, abilities or attitude that students should attain by the end of the course.

- Course outcomes for each subject are identified.
- The POs and PSOs are mapped with each course outcome and are shown Criterion 3.
- The compliance is found out by checking whether each domain maps with the relevant PO and PSO.

Course Code and Course Name	Course Outcomes
Introduction to Chemical Eng. ChBC-31	CO1: Introduction to Chemical Engineering: Origin, Growth, Relation to other sciences. CO2: Knowledge of Unit Operations and Unit Processes and its application to Chemical Process Industries. CO3: Concerns of Chemical Engineering in areas of Energy, Environment, new materials, health, bioengineering and safety. CO4: Implementation of Chemical Engineering Basics to simple systems. CO5: Role of modelling and simulation in chemical engineering.
Material and Energy Balance ChBC-32	CO1: To understand the fundamentals and basic principles of mass transfer in various unit operations and their applications in both chemical and non chemical systems. CO2: Identify and understand the principles of energy transfer for chemical systems. CO3: To design, analyze, formulate processes where both mass and energy balance is taking place for various engineering systems CO4: Application of Mass and energy balance for non conventional engineering systems.
Process Fluid Mechanics ChBC-33	CO1: Able to understand the fundamentals and basic principles of process fluid mechanics. CO2: Able to formulate and solve the fluid flow problems with the application of conservation laws. CO3: Able to examine energy losses and evaluate pressure drop in pipes. CO4: Able to understand and analyze the functions and performances of various equipments and flow measuring devices.
Thermodynamics and Chemical Kinetics ChBC-34	CO1: Understanding and application of laws of thermodynamics CO2: Ability of application of thermodynamics to phase equilibrium and reaction equilibrium. CO3: Basic Idea of Reactors CO4: Basic insight into the interpretation of kinetic data and reactor design.

Basic Electrical Eng. EEBC-31/EEBC-31	CO1: To analyze and evaluate the electrical circuits, apply basic laws in circuit theory and to determine electric circuit parameters. CO2: To study and analyses of AC and DC series-parallel circuit, various network theorems, and basics of phasor and power of electrical circuit. CO3: To analyses the characteristics of 3 phase systems, current and voltage relations in star/delta configuration's, Balanced/unbalanced systems. CO4: To study and analyze of fundamental/basic operation, construction and working DC machines. CO5: To study and analyze of fundamental/basic operation, construction and working AC machines.
Chemical Eng. Mathematics-I MTBC-31	CO1: Understand the concept of complex differentiation and analyticity of complex valued functions. CO2: Understand the concept of complex integration and its properties. CO3: Expand a complex valued function about a point using Taylor and Laurent's theorem. CO4: Understand the concept of Special functions like Legendre and Bessel functions and their properties.
Chemical Engineering Thermodynamics ChBC-41	CO1: Basic understanding of the thermodynamic properties of fluid, mixture and solutions. CO2: Apply thermodynamic principles to understand fugacity, partial molar properties, chemical potential, and activity coefficients for non-ideal fluid systems. CO3: Investigate binary phase equilibria; perform vapour-liquid equilibrium (VLE) calculations. CO4: Apply thermodynamic principles to reaction equilibrium between phases and reactions.
Heat Transfer ChBC-42	CO1: Able to understand the fundamentals and basic principles of conduction and convection heat transfer mechanisms and their applications in various heat transfer equipments in process industries. CO2: Able to formulate, analyze, design and solve the problems related to heat transfer. CO3: Able to perform the thermal analysis and sizing of heat transfer equipments. CO4: Able to understand radiation heat transfer.
Mechanical Operations ChBC-43	CO1: Understand the characterization, classification, conveying and storage of solids. CO2: Calculate the power requirements and crushing efficiencies of size reduction equipment using laws of communition and understand the working of different size reduction equipment. CO3: Analyze the screening results to estimate the screen effectiveness and acquire knowledge of screening mechanism and separation of solids from solids and gases. CO4: Apply the knowledge of filtration theory to estimate the filtration

	time, specific cake and medium resistance of filtration processes and understand the settling characteristics. CO5: Acquire the knowledge of agitation and different types of agitated vessels.
Fluid Mechanics and Mechanical Operations Lab. ChBC-44P	CO1: Make velocity measurements using flow meters and viscosity measurements by Stoke's Apparatus. CO2: Understand the laminar and turbulent flow behaviour, verify Bernoulli's principle and pipe fittings. CO3: Understand the classification, conveying and communication of solids. CO4: Understand the theories of sedimentation and to study the settling characteristics of batch settling.
Mass Transfer-I ChBC-45/ChBC-55	CO1: Fundamental understanding of mass transfer operation. CO2: Understanding of inter phase mass transfer and coefficients of mass transfer operation. CO3: Analyze gas absorption and tower characteristics. CO4: Understanding of absorption, humidification, drying and crystallization operation.
Seminar ChBS-41	CO1: To study research papers for understanding of new fields of interest, and to summarize and review. CO2: Imparting skills for effective report writing describing the project and the results. CO3: Identifying novel areas of research and latest trends in technologies. CO4: Development of Comprehensive communication skills.
Basic Electrical Engineering Lab EEBC-41P	CO1: Connection of Ammeters, Voltmeters, Wattmeter's and multi-meters in DC and AC circuits and selection of their ranges, Use of LCRQ meter. CO2: To verify the KVL, KCL, star/delta transformation, superposition and maximum power transfer theorem on DC circuits CO3: To measure electric power in single-phase AC circuits with resistive load, RL load and RLC load. CO4: To measure the power and power factor in three phase AC circuits.
Ethics and Self Awareness HSBC-41/HSBC-31	CO1: Study human experience and behavior situation in social and cultural context. CO2: Promote the appreciation of students' own culture, ethics and values as well as the culture, ethics and values of others. CO3: Empower students to think critically and evaluate theories, concepts and perspectives related to psychology, human mind and human behavior as well as current societal advances related to career. CO4: Develop an understanding of the importance of self-awareness, self-reflection and self-regulation as well as gain practical knowledge and experience.
Chemical Eng. Mathematics –II MTBC-41	CO1: To examine the use of probability theory in decision making. CO2: To develop rules for calculating different kinds of probabilities. CO3: To use different probability distributions and how to find their

	values. CO4: To learn how correlation analysis describes the degree to which two variables arelinearly related to each other.
Process Equipment Design- I ChBC-51	CO1: To apply the basic principles of fluid mechanics, heat transfer, mass transfer and mechanical operation in the design of chemical process equipment CO2: Design the appropriate process equipment for the required unit or process operation CO3: Selection of equipments for various applications CO4: Optimize the process condition CO5: To analyze and evaluate the performance of existing equipments.
Chemical Reaction Engineering ChBC-52	CO1: Understand the different types of reactions, their kinetics and their influence on chemical equilibrium. CO2: Design of single, isothermal plug-flow, CSTR, and batch reactors for a single homogeneous reaction. CO3: Analyze and size reactors while accounting for non-isothermal conditions and non-ideal flow patterns. CO4: Design reactors for the homogenous and heterogeneous, and understand their effect on performance equations for reactors
Material Science and Technology ChBC-53	CO1: Analyze the micro structure of crystalline materials like lattice systems, unit cells and theoretical density. CO2: Clear the concept of mechanical behaviour of materials through calculations and appropriate equations along with their failure mechanics including corrosion. CO3: Understand the concept of phase diagrams and their construction, usage and applications. CO4: Understand and analyze the heat treatment processes and their types involving solid state diffusion processes.
Chemical Technology-I ChBC-54	CO1: Understanding manufacturing technologies of organic and inorganic chemicals. CO2: Draw the process flow diagrams to represent the process and look for the solution of challenges faced by the process industry at large. CO3: Analyze the effect of chemical technology on safety and environment, through chemical reactions and mechanism involved. CO4: Understand Engineering problems related with a particular process industry and suggest solutions thereof.
Heat Transfer Lab. ChBC-56P/ChBC-55P	CO1: Estimate the thermal conductivity of a composite slab and verify the Fourier's law of heat conduction. CO2: Measure the Heat transfer coefficient for Forced convection. CO3: Understand and demonstrate the heat transfer in Shell and Tube Heat Exchanger. CO4: Measure the emissivity of gray body and verify Stefan Boltzmann's Law. CO5: Evaluate heat transfer in Drop and Film wise condensation.

Basic Management Principles HSBC-51	CO1: Relate, discuss, understand, and present management principles, processes and procedures in consideration of their effort on individual actions. CO2: Have developed a working knowledge of fundamental terminology and frameworks in the four functions of management: Planning, Organizing, Leading and Controlling. CO3: Be able to identify and apply appropriate management techniques for managing contemporary organizations. CO4: Participate, summarize and lead class discussions, case problems and situations from both the text and student experience that relate to the text material.
Numerical Methods MTBC-51	CO1: Study Errors in Numerical Methods and Solution of Algebraic and Transcendental equations. CO2: Study Solution of Simultaneous Algebraic equations, finite differences and interpolation. CO3: Evaluate Differentials and integrals by numerical methods CO4: Find solution of Differential equation by Numerical Methods.
Process Equipment Design- II ChBC-61	CO1: Basic understanding about the process equipments based on heat and mass transfer. CO2: Design of heat and mass transfer systems. CO3: Selection of equipments for various applications. CO4: Optimize the process conditions. CO5: To analyze and evaluate the performance of existing equipments.
Mass transfer-II ChBC-62	CO1: Understand the concept of distillation and determine the number of stages in distillation column. CO2: Select solvent for extraction operations and determine the number of stages in extraction operations CO3: Understand the concept of adsorption and determine the number of stages in adsorption operations. CO4: Select solvent for leaching operations and determine the number of stages in leaching operations.
Chemical Technology-II ChBC-63	CO1: Understanding manufacturing technologies of organic and inorganic chemicals. CO2: Draw the process flow diagrams to represent the process and look for the solution of challenges faced by the process industry at large. CO3: Analyze the effect of chemical technology on safety and environment, through chemical reactions and mechanism involved. CO4: Understand Engineering problems related with a particular process industry and suggest solutions thereof.
Energy Eng. ChBC-64	CO1: Basic understanding about various energy sources and their significance with respect to energy and environmental sustainability. CO2: Knowledge about the processing/generation of fuels and their significant characteristics for various applications. CO3: Design of the systems for efficient fuel utilization and maximum recovery of heat. CO4: Understanding energy audits and management of the non

	conventional energy utilizing systems.
Energy Eng. Lab ChBC-65P	CO1: Basic understanding about the Proximate Analysis of fuels and its significance with respect to energy. CO2: Demonstrate and understand the working principle, construction and operation of combustion equipment. CO3: Estimate the calorific value of solid fuels like coal to ascertain their suitability in a combustion equipment. CO4: Predict various fuel property parameters like flash point, fire point etc.
Process Instrumentation ChBC-66	CO1: Understand basic concept of instrumentation, principles and applications. CO2: Understand the measurement techniques for Temperature. CO3: Understand the measurement techniques for Pressure. CO4: Understand the measurement techniques for Flow and Level.
Transport Phenomenon ChBC-67	CO1: To Identify transport properties and analyze the mechanism of momentum, energy and mass transport. CO2: To Apply conservation laws to formulate differential form of equations of change for mass, momentum and heat transfer problems. CO3: To solve linear partial differential equations along with appropriate boundary conditions to get the velocity, temperature and concentration profiles of different engineering problems. CO4: Recognize non Newtonian fluids and apply appropriate models to solve them
Thermodynamics and Reaction Eng. Lab ChBC-68P	CO1:Standardization of chemical solution. CO2: Estimation of reaction rate constant of continuous and batch reactors. CO3: Determination of dispersion number of CSTR and packed reactors. CO4: To plot the RTD curve for CSTR and Packed bed reactor using a pulse and a step input.
Industrial Training and Presentation ChBC-69	CO1:Correlate class mode learning to real industrial applications CO2: Development of written and oral communication skills. CO3: Ability to be a multi-skilled engineer with good technical knowledge. CO4: Development of management, leadership and entrepreneurship skill.
Pre-Project work ChBP-71	CO1: Able to collect the information from literature reviews CO2: Classify a chemical engineering research problems CO3: Ability to analyze energy and environmental problem. CO4: Able to find objectives of research problems
Chemical Process Safety ChBC-72	CO1: Anticipate, recognize, investigate and evaluate hazardous conditions and practices affecting people, property and the environment. CO2: Develop and evaluate appropriate strategies designed to mitigate risk by understanding the importance of plant safety and safety regulations, different types of plant hazards and their measurement, control, principles and procedures of safety audit.

	CO3: Appreciate the importance of physical, chemical and physico-chemical transformations of the material in process industries with respect to safety. CO4: Analyze the hazards and assess the risk and Recognize that the practice of safety requires ongoing learning, and undertake appropriate preventive activities to address the need of safety.
Process Dynamics and Control ChBC-73	CO1: To understand and model the dynamic behavior of chemical processes based on their time domain, Laplace domain. CO2: Analyze the properties e.g. speed of response, frequency response of first order and second order systems. CO3: Analyze the different components of a control loop. CO4: Understand the operation of P, I, D and PID controllers and to tune them.
Process Dynamics and Control Lab ChBC-74P	CO1: Calculate the response of first order systems to step input CO2: Analyze dynamic behavior of liquid level as a first order system for different inputs. CO3: Find dynamic behavior of multi capacity systems. CO4: Analyze the behavior of 2^{nd} order systems to step input.
Process Economics and Plant Design ChBC-75	CO1: Understanding the role of economics in process plant design. CO2: Design optimization and profitability analysis. CO3: Application of various project management techniques. CO4: Understands the replacement and maintenance analysis.
Biochemical Eng. ChBC-76	CO1: Fundamental understanding of the subject based on various conversion routes. CO2: Acquire basic knowledge of microbiology, biochemistry and genetics. CO3: Exhibit knowledge for analysis of the bioprocess and the unit operations used. CO4: Able to analyze the data and its application in bioprocess development.
Mass Transfer Lab. ChBC-77P	CO1: Determination of gas and liquid diffusivity. CO2: Experimental determination of heat and mass transfer characteristics using wetted wall column and cooling tower. CO3: Plotting drying rate curve using wet solid. CO4: Determine Gas absorption characteristics using packed tower.
Operation Research MTBE-71	CO1: Able to formulating the real-world problem into the form of mathematical equations. CO2: Able to maximize or to minimize some numerical value. CO3: Able to determine the schedule for transporting goods from source to destination in a way that minimizes the shipping cost. CO4: Able to formulate the alternative strategy to compete with one another.
Human Resource Development HSBE-71	CO1:Identify each of the major HRM functions and processes of strategic HRM planning, job analysis and design, recruitment, selection, training and development, compensation and benefits, and performance

	appraisal. CO2: Define strategic HR planning and the HRM process to the organization's strategic management and decision making process. CO3: Recall the wide range of sources for attracting and recruiting talent and appropriate practices for job Placement. CO4: Recognize emerging trends, opportunities and challenges in performance appraisal and list training and development processes as well as future trends for HRM globalization.
Numerical Analysis MTBE-72	CO1: Study Interpolation and Integration by Numerical techniques. CO2: Study advanced methods in the Numerical solutions of algebraic and transcendental equations. CO3: Study advanced methods in Numerical solutions of ordinary differential equations. CO4: Numerical solution of Partial differential equations.
Computational Fluid Dynamics (E2) ChBE-74	CO1:Fundamental understanding and interpretation of governing equations involved in heat and fluid flow problems. CO2: Understanding of basic numerical techniques involved. CO3: Understanding of Grid formation. CO4: Understanding discretization technique's using FDM FVM.
Managerial Economics for Engineers HSBE-72	CO1: Understand the roles of managers in firms and understand the internal and external decisions to be made by managers. CO2: Analyze the demand and supply and elasticity conditions and assess the position of a company. CO3: Analyze the production function in one as well as in two variables and explain the relevance of economies of scale in production. CO4: Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
Project ChBP-81	CO1: Apply the knowledge of chemical engineering to design or fabricate a system. CO2: Identify chemical engineering research problems. CO3: Apply knowledge of chemical engineering to solve energy and environmental problem. CO4: Ability to write a research proposal.
Bioresoursce Technology ChBC-82	CO1: Fundamental understanding of the bioresourcesand its applications for attainment of social objectives (energy, environment, product, sustainability). CO2: Acquire knowledge with respect to the properties of the bioresources and the conversion technologies. CO3: Exhibiting knowledge of the systems used for bioresource technology. CO4: Understanding about analysis of data and their applications in design of the systems and development of the bioprocess.
Biochemical Eng. Lab ChBC-83P	CO1: Acquire basic knowledge of various equipments used in biochemical engineering lab. CO2: Fundamental understanding of techniques with respect to

	sterilization, preparation of solid and liquid media, culture growth and preservation. CO3: Basic understanding of estimation techniques for biomass, substrate and product. CO4: Generation and analysis of data for design and development of bioprocess.
Modelling and Simulation in Chemical Engineering ChBC-84	CO1: Identify the terms involved in inventory rate equation of mass, energy and momentum. CO2: Recall the basic concepts involved in modelling and simulation. CO3: Apply conservation of mass, momentum and energy equations to engineering problems. CO4: Develop model equations for chemical engineering systems. CO5: Solve the model equations and chemical engineering problems using numerical techniques.
Industrial Pollution Abatement ChBC-85	CO1: Understand the sources, effects and prevention of pollution and recycling of water and waste. CO2: Illustrate the methods to measure the industrial pollution. CO3: Understand the principles of industrial pollution control and design air pollution control systems. CO4: Apply the basic chemical engineering concepts in design of industrial wastewater treatment systems.
Petroleum Refinery (E3) ChBE-82	CO1: Knowledge about production of crude oil, along with its properties and characterization methods. CO2: Understand the process of fractionation and identify the specifications for good quality petroleum. CO3: Identify different products obtained from refining process and their best utilization. CO4: Integrate and evaluate problems pertaining to crude oil refinery engineering.
Nano-Science and Technology ChBE-84	CO1: Understand the properties of nanomaterials and their applications. CO2: Apply chemical engineering principles to nanoparticles production and scale-up. CO3: Solve the quantum confinement equations and analyze the nanomaterials characterization. CO4: State the applications of nanotechnology in electronics and chemical industries.
Process Heat Integration (E4) ChBE-85	CO1: Ability to understand the fundamentals of process integration. CO2: Ability to determine the minimum heating and cooling requirements. CO3: Ability to design minimum energy heat exchanger networks. CO4: Ability to understand the composite and grand composite curves.
Fuel Cell Technology ChBE-82	CO1: Understanding the basics of fuel cell technology in modern energy applications CO2: Analyzing the working and applications of various fuel cells. CO3: Understanding of the thermodynamic and kinetic aspects of fuel cell systems

	CO4: Assessment of various fuel cells by several characterization techniques.
Entrepreneurship Development HSBE-81	CO1: Define basic terms and analyse the business environment in order to identify business opportunities. CO2: Identify the elements of success of entrepreneurial ventures and the legal and financial conditions for starting a business venture. CO3: Evaluate the effectiveness of different entrepreneurial strategies and specify the basic performance indicators of entrepreneurial activity. CO4: Explain the importance of marketing and management in small businesses venture and interpret their own business plan.

Table B.2.1.4a: Course Outcomes of various courses for the Department of Chemical Engineering

Different methods/processes are used to identify the extent of compliance of the curriculum for attaining the Program Outcomes and Program Specific Outcomes based on the POs mentioned in SAR of NBA, subjects are segregated and mapped with POs and PSOs. Each Course has well defined course outcomes and they correlate to POs and PSOs leading to eventual attainment, as explained in detail in Criterion 3. This strong correlation among the COs and POs-PSOs, develops the necessary skills in students, and transforms them as proficient engineers. The chemical engineering department has set the attainment levels of POs and PSOs at 65%, 65% and 70% of average CO-PO & CO-PSO mapping values as target levels for the Academic Years 2017-2018, 2018-2019 and 2019-2020 respectively.

Course Component		**Curriculum Content (% of total**	**Total number of contact hours**	**Total Number of credits**	**Program Outcomes (POs)**	**Program Specific Outcomes (PSOs)**	**Program Educational Objectives (PEOs)**
1	**Mathematics**	7.25	15	15	PO1,PO2,PO3, PO4, PO5, PO6	PSO1,PSO3	PEO1, PEO 2, PEO 3, PEO4
2	**Basic Science**	8.7	18	18	PO1,PO2,PO3,PO4,PO6, PO7, PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
3	**Basic Eng. Course**	11.11	34	23	PO1,PO2,PO3,PO4.PO5,PO6, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
4	**Computing**	3.8	8	8	PO1,PO2, PO3, PO5	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
5	**Humanities and Social Science**	6.28	13	13	PO6,PO8,PO9,PO10,PO11,PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
6	**Professional Core**	50.24	117	104	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO8, PO9, PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4

7	**Electives (Department and open)**	5.8	12	12	PO1,PO2,PO3,PO4,PO5, PO6,PO7, PO8, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
8	**Projects/Training/ Seminar**	6.76	28	14	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO9,PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
	Total	100	245	207			

Table B.2.1.4b: Mapping of course components to POs and PSOs for 2014 Scheme

Course Component		**Curriculum Content (% of total**	**Total number of contact hours**	**Total Number of credits**	**Program Outcomes (POs)**	**Program Specific Outcomes (PSOs)**	**Program Educational Objectives (PEOs)**
1	**Mathematics**	8.7	18	18	PO1,PO2,PO3, PO4, PO5, PO6	PSO1,PSO3	PEO1, PEO 2, PEO 3, PEO4
2	**Basic Science**	8.7	18	18	PO1,PO2,PO3,PO4,PO6, PO7, PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
3	**Basic Eng. Course**	11.11	34	23	PO1,PO2,PO3,PO4.PO5,PO6, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
4	**Computing**	3.8	8	8	PO1,PO2, PO3, PO5	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
5	**Humanities and Social Science**	5.3	11	11	PO6,PO8,PO9,PO10,PO11,PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
6	**Professional Core**	49.75	116	103	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO8, PO9, PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
7	**Electives (Department and open)**	5.8	12	12	PO1,PO2,PO3,PO4,PO5, PO6,PO7, PO8, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
8	**Projects/Training/ Seminar**	6.76	28	14	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO9,PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
	Total	100	245	207			

Table B.2.1.4c: Mapping of course components to POs and PSOs for 2017 scheme

Course Component		Curriculum Content (% of total	Total number of contact hours	Total Number of credits	Program Outcomes (POs)	Program Specific Outcomes (PSOs)	Program Educational Objectives (PEOs)
1	**Mathematics**	10	20	20	PO1,PO2,PO3, PO4, PO5, PO6	PSO1,PSO3	PEO1, PEO 2, PEO 3, PEO4
2	**Basic Science**	6.5	15	13	PO1,PO2,PO3,PO4,PO6, PO7, PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
3	**Basic Eng. Course**	11	26	22	PO1,PO2,PO3,PO4.PO5, PO6, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
4	**Computing**	2.5	7	5	PO1,PO2, PO3, PO5	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
5	**Humanities and Social Science**	6	13	12	PO6,PO8,PO9,PO10, PO11,PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
6	**Professional Core**	51	111	102	PO1,PO2,PO3,PO4,PO5, PO6, PO7,PO8, PO9, PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
7	**Electives (Department and open)**	6	12	12	PO1,PO2,PO3,PO4, PO5,, PO6,PO7, PO8, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
8	**Projects/Training / Seminar**	7	28	14	PO1,PO2,PO3,PO4,PO5, PO6, PO7,PO9,PO10, PO11, PO12	PSO1,PSO2,PSO3	PEO1, PEO 2, PEO 3, PEO4
	Total	100	232	200			

Table B.2.1.4d: Mapping of course components to POs and PSOs for 2019 scheme

2.2 Teaching-Learning Processes (70)

Claimed 65

2.2.1 Describe the process followed to improve quality of Teaching-Learning (15)

Claimed 15

Our concern here is specifically with teaching, as opposed to research program structure and administration. Prime focus is given as to how an instructor can improve the quality of instruction in an individual course, and then the more difficult question of how an academic organization (which in our case is our academic Department) can improve the quality of its instructional program.

A. Adherence to Academic Calendar

The course delivery and the conduct of activities are planned in accordance with the academic calendar. All the academic and extracurricular activities of the department are conducted with strict adherence to the academic calendar. The academic calendar serves as an information source and planning document for students, faculty and staff of the Department. The academic calendar is prepared at the beginning of a calendar year with a clear plan of conducting examinations, co-curricular and extracurricular activities of the Institute. Subject allotment is done well in advance for the staff to prepare lesson plans, course plan, soft and hard copies of the lecture notes. Adherence of academic activities with the academic calendars for the calendar years 2020, 2019 and 2018 are detailed in the tables given below:

Adherence Report Academic Calendar for the year- 2020

SPRING-2020					
S. No.	**Activity**	**Date**		**Adherence**	**Remark**
		From	**To**		
1.	Registration for U.G. 2nd Semester	09-03-2020	11-03-2020	Yes	Executed on Date
	Commencement of classes of U.G. 2nd Semester	12-03-2020		Yes	Executed on Date
	Registration for U.G. 4th Semester	12-03-2020	13-03-2020	Yes	Executed on Date
	Commencement of classes of U.G. 4th Semester	16-03-2020		Yes	Executed on Date
	Registration for U.G. 6th Semester	16-03-2020	17-03-2020	Yes	Executed on Date
	Commencement of classes of U.G. 6th Semester	18-03-2020		Yes	Executed on Date
	Registration for U.G. 8th Semester	09-03-2020	11-03-2020	Yes	Executed on Date
	Commencement of classes of U.G. 8th Semester	12-03-2020		Yes	Executed on Date
	Registration for P.G. & PhD	09-03-2020	11-03-2020	Yes	Executed on Date
	Commencement of classes of P.G. & PhD	12-03-2020		Yes	Executed on Date
2.	Registration with late fee @ Rs.400/=per day	Applicable after 5th day of Registration		Yes	Executed on Date
3.	Sports week	11-04-2020	13-04-202	Suspended	Due to spread of COVID-19 Pandemic
4.	Mid-Term examination	04-05-2020		Suspended	Due to spread of COVID-19 Pandemic
5.	Advertisement for admission to: a) M. Tech (sponsored category) b) Ph. D	Last Week of May		Suspended	Due to spread of COVID-19 Pandemic
End-Term Examinations					
6.	B. Tech Project viva-voce Exam	Last week of May,2020		Postponed	Due to spread of COVID-19 Pandemic
	B. Tech 8th Semester	10-06-2020 13-06-2020		Postponed	Due to spread of COVID-19 Pandemic
	Registration for Supplementary Examinations with Regular candidates	03-06-2020to 07-06-2020		Postponed	Due to spread of COVID-19 Pandemic
	B.Tech. 2nd,4th&6th M.Tech/M.Sc. 2nd & 4th semesters and Ph.D.	From 10-06-2020		Postponed	Due to spread of COVID-19 Pandemic
7.	Registration for Supplementary Examinations (Odd Semester)	15-06-2020 to 26 -06-2020		Postponed	Due to spread of COVID-19 Pandemic
8.	Supplementary Examinations for odd Semesters	From 05-07-2020		Postponed	Due to spread of COVID-19 Pandemic
9.	Registration for Special Supplementary Exam for 8th Semester	01-06-2019 to -2019		Postponed	Due to spread of COVID-19 Pandemic
Autumn-2020					
Registration & Commencement of Classes					
1.	RegistrationforU.G.,P.G.&Ph.D.	29-07-2019	01-08-2019	Yes	Executed on Date
	Registration with late fee @ Rs.400/=per day	Upto 05-08-2019		No	Relaxed due to abrogation of Article 370 in J&K
	Commencement of classes	01-08-2019		No	Postponeddue to abrogation of Article 370 in J&K. Classes commenced from 11 Nov, 2019.

2.	Fresher's Orientation day	20-08-2019		Postponed	Held on 15 Nov, 2019
3.	Sports Event	06-09-2019	08-09-2019	Suspended	Due to abrogation of Article 370 in J&K
4.	Midterm Examinations	16-09-2019		Suspended	Due to abrogation of Article 370 in J&K
5.	Convocation	28-09-2019		Deferred	Due to abrogation of Article 370 in J&K
6.	National Entrepreneurship Day	09-11-2019		Deferred	Due to abrogation of Article 370 in J&K
End-Term Examinations					
7.	Practical Examinations	1st week of November		Postponed	3rd week of December
8.	Registration for Supplementary Examinations with Regular candidates	01-11-2019 to 07-11-2019		Yes	
9.	End Semester Examinations	From 11-11-2019		Postponed	25-02-2020
10.	Registration for Supplementary Examinations (Even Semester)	20-11-2019 to 28-11-2019		Yes	
11.	Supplementary Examinations for Even Semesters	From 01-12-2019		Postponed	16-03-2020
12.	Winter Vacations for Students	10-12-2019		Yes	Executed on Date

Table B.2.2.1a: Adherence Report for Academic Calendar for the Calendar Year 2020

Adherence Report Academic Calendar for the year- 2019

SPRING-2019					
S. No.	**Activity**	**Date**		**Adherence**	**Remark**
		From	**To**		
1.	Reopening of Institute for Faculty	18-02-2019		Yes	Executed on Date
	Registration forU.G. , P.G &Ph.D.	18-02-2019	22-02-2019	Yes	Executed on Date
	Registration with late fee @ Rs.400/=per day	25-02-2019	28-02-2019	Yes	Executed on Date
	Commencement of classes	Upto 25-02-2019		Yes	Executed on Date
2.	Mid-Term Examinations	18-04-2018		Yes	Executed on Date
3.	Techvaganza	27-04-2019 & 28-04-2019		Yes	
4.	Advertisement for admission to: c) M. Tech (sponsored category) d) Ph. D	3rd Week of May		Yes	Executed on Date
End-Term Examinations					
5.	B. Tech 8th Semester	From 23-05-2 019		Yes	Executed on Date
	B. Tech Project viva-voce Exam	10-06-2019 13-06-2019		Yes	Executed on Date
	Registration for Supplementary Examinations with Regular candidates	03-06-2019 to 07-06-2019		Yes	Executed on Date
	B.Tech. 2nd,4th&6th M.Tech/M.Sc. 2nd & 4th semesters and Ph.D.	From 10-06-2019		Yes	Executed on Date
6	Registration for Supplementary Examinations (Odd Semester)	24-06-2019 to 02-07-2019		Yes	Executed on Date
7.	Supplementary Examinations for odd Semesters	From 04-07-2019		Yes	Executed on Date
8.	Registration for Special Supplementary Exam for 8th Semester	01-07-2019 to 11-07-2019		Yes	Executed on Date
9.	Special Supplementary Examinations for 8th Semester	From 15-07-2019		Yes	Executed on Date
10.	Summer Break	23-06-2019	28-07-2019	Yes	Executed on Date

Autumn-2019					
Registration & Commencement of Classes					
1.	RegistrationforU.G.,P.G.&Ph.D.	29-07-2019	01-08-2019	Yes	Executed on Date
	Registration with late fee @ Rs.400/=per day	Upto 05-08-2019		No	Relaxed due to abrogation of Article 370 in J&K
	Commencement of classes	01-08-2019		No	Postponed due to abrogation of Article 370 in J&K. Classes commenced from 11 Nov, 2019.
2.	Fresher's Orientation day	20-08-2019		Postponed	Held on 15 Nov, 2019
3.	Sports Event	06-09-2019	08-09-2019	Suspended	Due to abrogation of Article 370 in J&K
4.	Midterm Examinations	16-09-2019		Suspended	Due to abrogation of Article 370 in J&K
5.	Convocation	28-09-2019		Deferred	Due to abrogation of Article 370 in J&K
6.	National Entrepreneurship Day	09-11-2019		Deferred	Due to abrogation of Article 370 in J&K
End-Term Examinations					
7.	Practical Examinations	1st week of November		Postponed	3rd week of December
8.	Registration for Supplementary Examinations with Regular candidates	01-11-2019 to 07-11-2019		Yes	
9.	End Semester Examinations	From 11-11-2019		Postponed	25-02-2020
10.	Registration for Supplementary Examinations (Even Semester)	20-11-2019 to 28-11-2019		Yes	
11.	Supplementary Examinations for Even Semesters	From 01-12-2019		Postponed	16-03-2020
12.	Winter Vacations for Students	10-12-2019		Yes	Executed on Date

Table B.2.2.1b: Adherence Report for Academic Calendar for the Calendar Year 2019

Adherence Report Academic Calendar for the year- 2018

S.No.	Activity	Date		Adherence	Remark
		From	To		
	REGISTRATION	19-02-2018	21-02-2018	Yes	Executed on Date
01.	B.Tech. 8th semester				
02.	Registration with late fee @ Rs. 400/= per day	Up to 26-02-2018		Yes	Executed on Date
03.	B.Tech.. 2nd 4th& 6th semesters and M.Tech./ M.Sc. 2nd& 4th and Ph.D.	26-02-2018 to 28-02-2018		Yes	Executed on Date
04.	Registration with late fee @ Rs. 400/= per day	Up to 05-03-2018		Yes	Implemented
05.	COMMENCEMENT OF CLASSES				
06.	Commencement of Classes for B.Tech.. 8th semester	22-02-2018		Yes	Executed on Date
07.	Commencement of Classes for B.Tech.. 2nd& 4th , 6th semesters and M.Tech./ M.Sc. 2nd& 4th and Ph.D.	01-03-2018		Yes	Executed on Date
08.	Extra-Curricular Activities	28-04-2018 to 30-04-2018		Yes	Executed on Date
09.	Alumni meet-2018	28-04-2018 to 29-04-2018		Yes	Executed on Date
10.	B.Tech.. 8th Semester	16-04-2018 to 21-04-2018		Yes	Executed on Date

11.	B.Tech.. 2nd,4th& 6th; M.Tech./M.Sc. 2nd& 4th semesters and Ph.D..	23-04-2018 to 28-04-2018	Yes	Executed on Date
12.	ANNUAL DAY	01-05-2018	Deferred	Lock down
	PRACTICAL EXAMINATIONS			
13.	B.Tech.. Project viva-voce Exam	11-06-2018 to 12-06-2018	Yes	Executed on Date
14.	M.Tech. Dissertation Viva-voce Exam	1st week of July-2018	Yes	Executed on Date
	END SEMESTER			
15.	B.Tech.. 8th	28-05-2018	Yes	Executed on Date
16.	B.Tech.. 2nd, 4th& 6th; M.Tech. / M.Sc. 2nd& 4th semesters and Ph.D.	19-06-2018	Yes	Executed on Date
17.	Advertisement for Ph.D. admissions	Last week of May-2018	Yes	Executed on Date
18.	Supplementary Examinations for odd semester	From 02-07-2018	Yes	Executed on Date
19.	Summer Break	10-07-2018 22-07-2018	Yes	Executed on Date
20.	Special Supplementary Examinations for 8th semester	16-07-2018	Yes	Executed on Date
21.	Registration for U.G., P.G. & Ph.D.	23-07-2018 to 25-07-2018	Yes	Executed on Date
22.	Registration with late fee @Rs 400/= per day	Up to 30-07-2018	Yes	Executed on Date
23.	Commencement of classes	26-07-2018	Yes	Executed on Date
24.	Extracurricular activity	07-09-2018 to 15-09-2018	No	Deferred due Prevailing condition
25.	Midterm examination	10-09-2018 to 15-09-2018	Postponed one week	17-09-2018 to 22-09-2018
26.	Convocation	22-09-2018	Yes	Executed on Date
27.	Alumni meet Delhi chapter	29-09-2018 to 30-09-2018	Yes	Executed on Date
28.	Practical examination	1st week of November	Yes	Executed on Date
29.	National Entrepreneur day	09-11-2018	Yes	Executed on Date
30.	End semester examination	From 12-11-2018	Yes	Executed on Date
31	Supplementary examinations for even semester	From 26-11-2018	Yes	Executed on Date
32.	Winter vacation for students	10-12-2018	Yes	Executed on Date

Table B.2.2.1c: Adherence Report for Academic Calendar Year 2018

B. Pedagogical Initiatives

We may define good teaching as instruction that leads to effective learning, which in turn means thorough and lasting acquisition of the knowledge, skills, and values the instructor or the institution that has set out to impart. In the sections that follow, we describe several strategies, known to be particularly effective and as implemented in the departmental teaching methodologies.

1. Instructional objectives are met

Instructional objectives are statements of specific observable actions that students should be able to perform if they have mastered the content and skills the instructor has attempted to teach. An instructional objective has one of the following stems:

*At the end of this [course, chapter, week, lecture], the student should be able to ****
*To do well on the next exam, the student should be able to ****
Where *** is a phrase that begins with an action verb (e.g., *list, calculate, solve, estimate, describe, explain, paraphrase, interpret, predict, model, design, optimize*…). The outcome of the specified action must be directly observable by the instructor: words like "learn," "know," "understand," and "appreciate," while important, do not qualify.

Following are illustrative phrases that are attached to the stem of an instructional objective, grouped in six categories according to the levels of thinking they require.

i. ***Knowledge*** *(repeating verbatim)*
ii. ***Comprehension*** *(demonstrating understanding of terms and concepts)*
iii. ***Application*** *(solving problems)*
iv. ***Analysis*** *(breaking things down into their elements, formulating theoretical explanations or mathematical or logical models for observed phenomena)*
v. ***Synthesis*** *(creating something, combining elements in novel ways)*
vi. ***Evaluation*** *(choosing from among alternatives)*

Well-formulated instructional objectives help the teachers prepare lectures and assignment schedules and facilitate construction of in-class activities, out-of-class assignments, and tests. The greatest benefit comes when the objectives cover all of the content and skills the teacher wishes to teach and they are handed out as study guides prior to examinations. The more explicitly students know what is expected of them, the more likely they are to meet the expectations.

2. Active Learning is promoted in Class

Most students cannot stay focused throughout a lecture. After about 10 minutes their attention begins to drift, first for brief moments and then for longer intervals, and by the end of the lecture they are taking in very little and retaining less. A classroom research study showed that immediately after a lecture, students recalled 70% of the information presented in the first ten minutes and only 20% of that from the last ten minutes.
Therefore, students' attention is maintained throughout a class session by periodically giving them something to do. Many different activities serve this purpose, of which the most common is the quick question exercise.

Active learning exercises address a variety of objectives. Some examples follow:

i. Recalling Prior Material**:** The students may be given one minute to list as many points as they can recall about the previous lecture or about a specific topic covered in an assigned reading.

ii. Responding to Questions**:** Any questions a teacher normally asks in class is directed to groups. In most classes—especially large ones—very few students are willing to volunteer answers to questions, even if they know the answers. When the questions are directed to small groups, most students attempt to come up with answers and the teacher thus, gets as many responses as he or she wants.

iii. Problem Solving: A large problem can always be broken into a series of steps, such as paraphrasing the problem statement, sketching a schematic or flow chart, predicting a solution,

writing the relevant equations, solving them or outlining a solution procedure, and checking and/or interpreting the solution. When working through a problem in class, the instructor usually completes some basic pre-requisite steps and then asks the student groups to attempt others. It should be ensured and is generally followed, that the groups should generally be given enough time to think about what they have been asked to do and begin formulating a response but not necessarily enough to reach closure.

iv. Generating Questions and Summarizing: The students are given a minute to come upwith two good questions about the preceding lecture segment or to summarize the major points in the lecture just concluded.

3. Assessment and Evaluation of Teaching Quality

Most institutions use only end-of-course student surveys to evaluate teaching quality. While student opinions are important and should be including in any assessment plan, meaningful evaluation of teaching must rely primarily on assessment of learning outcomes. Current trends in assessment include shifting from standardized tests to performance-based assessments, from teaching-based models to learning-based models of student development, and from assessment as an add-on to more naturalistic approaches embedded in actual instructional delivery. Measures that are used to obtain an accurate picture of students' content knowledge and skills include tests, performance investigations, project reports, and learning logs and journals.

Improving teaching requires identifying problems with existing academic practices and then applying a combination of sound educational and psychological principles to devise a better approach. Such approaches have already been devised.

- Faculty members and administrators define the knowledge, skills, and values that the graduates of the program should have.
- With the assistance of experts in pedagogy and learning assessment, the faculty defines the instructional methods most likely to lead to the acquisition of the desired attributes, selects the methods needed to assess the effectiveness of the instruction, and estimates the resources needed to implement both the instruction and the assessment.
- The administration commits to provide both the necessary resources to initiate and sustain the program and appropriate incentives for faculty members to participate.
- The faculty and administration formulate a detailed implementation plan.
- The faculty implements the plan.
- The faculty and administration assess the results and modify the plan as necessary to move closer to the desired outcomes.

4. Mentoring System to Help at Individual Levels

The functions of the mentors include:

- Monitoring the academic and general progress of the students.
- Advising them on elective course selection.
- Monitoring their attendance.
- Advising them to register for supplementary exams based on their progress and capabilities.
- Counseling the students on general matters, discipline, conduct and ethical values.
- Monitoring their attendance.

- Advising them to register for supplementary exams based on their progress and capabilities.
- Counseling the students on general matters, discipline, conduct and ethical values.

To carry out pedagogical initiatives, the following methodologies are employed:

a) Real time examples

- To demonstrate the complexity and unpredictability of real issues, and to stimulate critical thinking real world examples are discussed.
- Inter- and multi-disciplinary approaches are used for problem solving.
- In order to demonstrate that there is no perfect solution to a particular problem real world problems are invoked.
- Real world examples help students think more analytically about the solutions.

b) **Interactive classrooms:** Classes are made more interactive by encouraging student participation as follows:

- Asking students to elaborate something they have written in a response paper or on the class' discussion board.
- Having students to answer other students' questions.
- Punctuating the lecture with questions.
- Interrupting the lecture with a sample exam question.
- Asking students to interpret a statistic, a graph, a chart, or another visual image.
- Integrating a case study or an inquiry or a problem solving exercise into the class.
- Integrating student presentations into the class.
- Asking questions that involve higher-order thinking skills like diagnostic, challenge, evaluation or prediction questions.
- Asking students to summarize the main points that they learned in class that day and the points they found most confusing.
- Asking the students to explain the relevance, utility, or significance of the information presented in the class.

c) Slide Presentation: Slide presentation is used to benefit the students by engaging in multiple learning styles, increasing visual impact, improving audience focus and providing annotations and highlights.

d) Video Lectures: Video lectures are imparted that are archived and can be accessed anytime anywhere. For certain topics and concepts video can be used by the novice students who have lower knowledge to process the concepts. Almost 50% of the lecture halls are fitted with LCD projectors for facilitate this initiative.

e) Collaborative learning: Theory subjects and Lab

- Groups comprising a maximum of five to six students are formed in each class.
- One from the group is designated as the group leader.
- Each group may be assigned tasks by the faculty and a report on the activity is provided by the respective group leader.
- An assessment on the report is done by the faculty to analyze the expected outcome from the activity is achieved.
- The tasks assigned could be a minimum of three in each semester as decided by the faculty member.

- The focus of the tasks is on learning new technologies, enhance the knowledge on a particular topic, studying new tools to be in pace with the industry, doing some mini projects, etc.
- Additional experiments could be assigned to each group in lab sessions.
- Faculty encourages each group to disseminate the knowledge they have gathered to others.

f) Group Discussion: Group Discussions is an excellent strategy for enhancing student motivation, fostering, intellectual agility and encouraging democratic habits. It create opportunities for students to practice and to sharpen a number of skills including the ability to articulate and defend positions, consider different points of view, and enlist and evaluate evidence. The group discussions are promoted in the theory and lab classes.

g) Assignments: The purpose of the writing assignments is to help each student develop research and communication skills so they obtain the necessary information literacy skills to complete the engineering curriculum.

- Writing assignments is a flexible means of demonstrating learning as well as a method of exploring one's thinking to stimulate learning. The civil engineering department strictly follows this method
- A minimum of two assignments is given for each course in a semester.
- The assignment given could be theoretical or a practical implementation.
- The assignments are designed so that the COs, POs and PSOs are covered in the questions asked in the assignments.

h) Conducting Quiz

- Quizzes are conducted for all courses in all semesters.
- At least one quiz competition is held per course in semester.
- Faculty keeps a document of the quiz questions.
- The mode of conducting quiz is oral the class.
- Quiz Competitions are organized to promote scholastic excellence and to provide a venue for interaction amongst students.

i) Tutorials: Tutorials are generally intended to

- Enables the students to pursue their individual academic interests within the context of the subject.
- Helps the students to gain a deep understanding of the subject matter.
- Develop students' ability to think and act likes a professional in their discipline.
- Develop students' basic academic skills like identification and evaluation of relevant resources, effective communication, effective time-management etc.
- For each subject, at least one hour in every week is allotted for conducting tutorial as shown under the heading "Structure of Curriculum" above.
- A tutorial register is maintained for each subject and regularly maintained by the concerned faculty.

j) Self-Learning Facility: The self- learning facilities provided in the institute are:

- A Common Computing Centre equipped with more than 100 computers is available 12 hours per day with internet facility.
- A computer lab equipped with 30 computers having necessary system and application software is functioning 12 hours per day for students to carry out their work.

- Wi-Fi facility of 10Mbps speed is available which can be accessed anywhere in the campus.
- A Central Library with an excellent collection of Books, Journals, Technical magazines, Newspapers and non-book materials in engineering and technology, science, humanities and management like CD-ROMs are available.
- The digital library provides IP enabled access to a large number of full texts on line journal databases from the various publishers such as Science direct etc.

k) Co-curricular Activities: Guest Lectures/ Workshops

- Every year a number of eminent personalities are invited from a variety of fields, articulating their thoughts and elaborating on their well known works, ranging from current rages to the age old topics.

l) Internal Assessment Tests

- Two internal assessment tests are conducted in every semester.
- The first test is conducted after the completion of the first module of each subject.
- The duration of the each test is one hour.
- The results of each test are analyzed to identify the weak and bright students.
- The bright students are assigned some task by the faculty to encourage their performance.
- Remedial classes and tests are conducted for the weaker students after each test and the remedial test results are analyzed to identify the impact.

m) Industrial Training and Industrial Visits: The objectives of the industrial training are to expose the students to the engineering practice which is specific to their course specialization and to the nature of the industry selected. This exposes the students to the responsibilities of an engineer and the engineering profession such as to develop the students' communication skills. These skills are developed by daily interaction within the working environment and technical writing.

- The students of the chemical engineering department are deputed to very important infrastructure projects for undergoing industrial training of minimum 6 weeks, at 5th and 6th semester levels.
- The same is evaluated at the end of 7^{th} semester.
- In addition, the students visit several industrial sites depending upon their faculty members and the availability of the industries.

n) Exhibitions

- Project exhibitions are encouraged during programs of technical festivals such as TECHVAGANZA etc. organized by NIT Srinagar.
- Students are encouraged to take part in exhibitions conducted by various organizations so that their innovative ideas are made known to the public.

C. Methodologies to support weak students and encourage bright students

Chemical Engineering Department has always strived on the culture of encouraging bright students as well as helping weak students by providing them necessary guidance and moral support. The weaker students are monitored constantly through their class performance, attendance; quiz outcomes and even grades and pointers. They are helped by arranging extra classes and tutorials. Apart from this, critical cases are even addressed by proper counselling and support by the faculty members. Individual attention is also provided to motivate certain weaker student sections.

The students who scored less than 50% marks belong to group of weak student and above 80% belong to the group of bright students.

- A total of three tests will be conducted in each semester to assess the student's performance in subjects.
- Remedial classes will be conducted for the weak students by each faculty.
- The number of hours taken for remedial classes will be decided by the faculty as required.
- A remedial test will be conducted for the weaker students thereafter and the results are analyzed to identify the impact of the remedial classes.
- Additional measures will be taken by the respective faculty in cases where the students fail to achieve the objective of remedial classes.

The department has a well-defined process of monitoring, guiding and assisting slow learners (weak students). Care is taken by the faculties in monitoring the performance of slow learners, the students deviations from studies is observed by the respective section coordinators and corrective measures are suggested.

The observable impact of assisting weak students is reduced number of identifiable weak students and improved results with less number of failures in each subject.

On the other hand, class toppers are felicitated by encouragement. The bright students are identified based on their overall performance and their orientation towards academics. The students who scored above 80% marks belong to the group of bright students. The measures taken to encourage bright students will be decided by the respective faculty.
The measures taken may include the following and additional actions may be according to the requirement:

- Recommend some quality references.
- Provide details of books to be referred.
- Suggest some e-resources and journals.
- Motivate them to support/assist weak students.
- Self-learning facility.

They are even encouraged to attend conferences, workshops and publish papers; encouraged to take up innovative projects. Bright students having high academic track records are encouraged by faculties to achieve university ranks, also encouraged to take up competitive examinations like GATE, GRE etc.

Assisting Weak Students:

- They are supported by the student mentoring and faculty mentoring, extra classes, remedial class and study hours are conducted.
- Behavior problems are corrected through counseling system.
- During the lab, special assistance given by other bright students and also lab technicians.

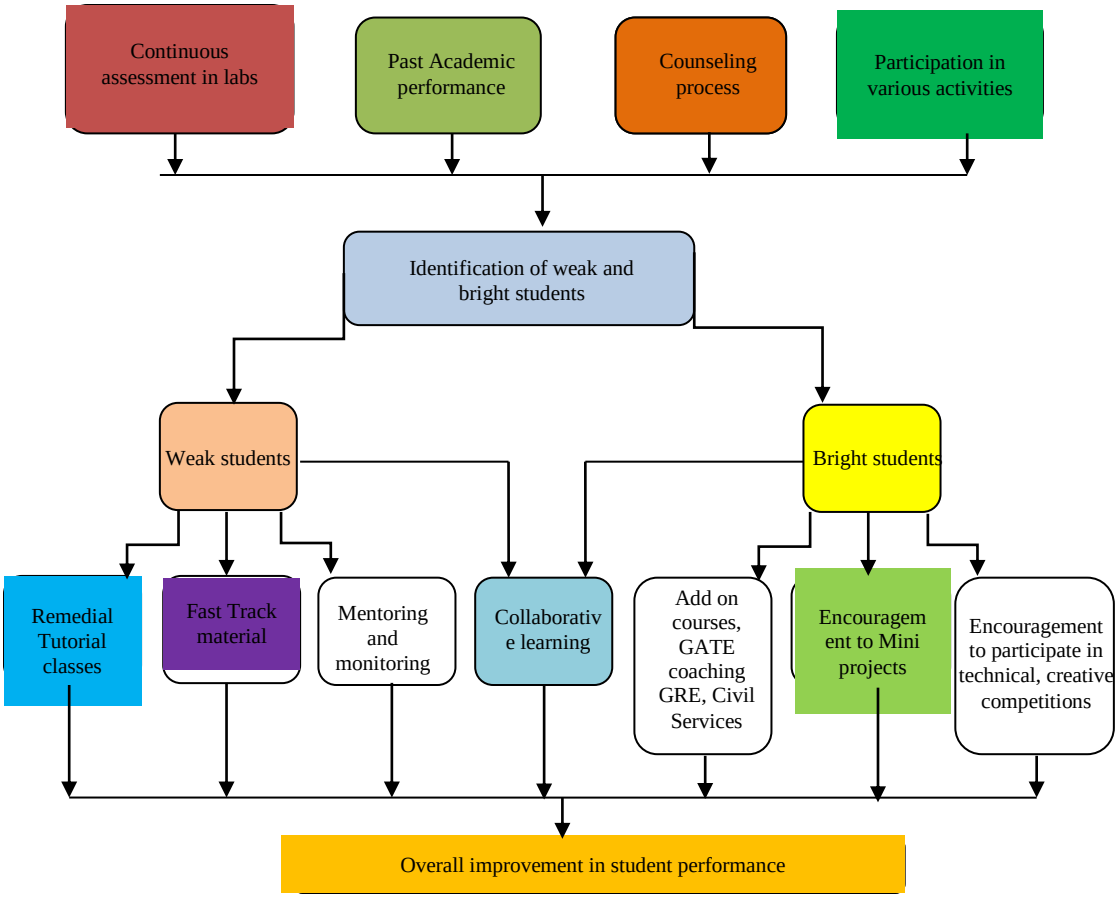


Figure B.2.2a: Process to identify and monitor weak and bright students

The impact of this methodology usually produces very good results in the overall performance of students and exemplary results in their examinations. Improvement in analytical abilities of students thus improve the professional bent of students and serves as a good check on the adherence to all PO's in the departmental ideology.

D. Quality of Classroom Teaching (Observation in a Class)

The faculty of the department adopts various innovative Teaching and Learning methodologies to create the best learning environment for students. These methodologies include traditional white board teaching, presentations, NPTEL/video lecturing. Various collaborative learning methods are used where every concept is correlated with real world illustrations, design and problematic aspects and are conveyed in a precise manner. The faculty are oriented towards Outcome based Education (OBE) and are actively utilizing the OBE to cater to the learning needs of students in an innovative manner. The lecture session duration is 50 minutes or 100 minutes. The Laboratory duration is 2-3 hours. Assignments are given to students for their better performance. Tutorial/Remedial classes are conducted for the slow learners of the class based on their performance in external exams and after the first internals. Motivating and guiding students for higher studies and university ranks is the vision for academic growth. Technical quizzers are also conducted for the students. All the faculties are requested to maintain attendance registers, course files, work dairies. Industrial visits are conducted at least once a year to reduce the gap between industry and institute. Workshops are organized to help the students to understand

concepts beyond curriculum. One-one discussion, interaction between Professors and students has increased confidence levels of the students. To meet the current requirements of the industry, the syllabus is formulated in light of the PO's. Project Work allows them to gain in depth knowledge as they carry out literature survey of the concepts, and hands on experience of the tools and hardware. Through the experiences of independent research, students are better prepared in the areas of critical thinking and learning. This encourages the students to pursue graduate studies and research work.

E. Implementation Details

Modes of delivery of courses:

The following are various content delivery methods used to deliver the courses:

Mth1 – Lectures
Mth2 – Tutorial Sessions
Mth3 – Laboratory Sittings
Mth4 – Quiz/Assignment
Mth5 – Presentations
Mth6 – Research Literature
Mth7 – Guest/Extension Lectures
Mth8 – Workshop Sessions

- **Mth1 – Lectures (Online/Offline)**

Lectures held in classrooms/virtual platforms to help in transmitting the knowledge. Here, the course coordinator disseminates the information to the students. Each lecture is generally delivered according to the Course Plan which is distributed to the students at the beginning of the course during the start of each semester. Students are encouraged to interact during the lectures. Thus, lectures generally help in the attainment of POs.

- **Mth2 – Tutorial Sessions**

Tutorials are generally intended to

i. Enable students to pursue their individual academic interests within the context of the subject.
ii. Help students to gain a deep understanding of the subject matter.
iii. Develop student’s ability to think and act like a professional in their discipline.
iv. Develop student’s basic academic skills like identification and evaluation of relevant resources, effective communication, effective time-management etc.
v. For each subject, one hour in every week is allotted for conducting tutorial.

The tutorials help motivating the students to closely interact with the course coordinator/teaching assistant and the peer group and help in attainment of PO2, PO3 and PO4.Tutorial are conducted to give exercises to the students and also to closely monitor their learning ability and achievement. Tutorials have improved interaction of the students with faculty members which in turn has improved their learning outcomes. Further, tutorials have provided opportunity to the students to improve their problem analysis and solving skills, team collaboration and communication skills.

- **Mth3 – Laboratory Sittings/ Virtual lab sessions**

Courses having associated laboratory in curriculum help the students in formulating the link between the theory and practice and hence acquire skills. Specific tasks are assigned to the students individually or in groups. These tasks help the student(s) to comprehend the behaviour of processes. The students also acquire the skills to utilize the equipment, software and tools. After solving each task, the students are supposed to interpret the outcome and provide valid conclusions/remarks. Hence, these laboratory sittings help in attainment of PO4, PO5, PO8 and PO9. Due to COVID-19 lockdown, in the session Spring 2020, the lab material, links from other sources were uploaded on department website and the interaction sessions were held online.

- **Mth4 – Quiz/Assignment**

Generally 1-2 surprise quizzes are held during each semester for every course. Such quizzes are based on objective questions viz. multiple choice questions, questions/problems requiring one word answer, recalling the important equations/theorems, etc. Surprise quiz and assignments allocation alerts the students to be prepared for each session. These sessions also help in attainment of the specific POs.

- **Mth5 – Presentations**

Slide presentations can be used in courses more geared toward information exchange than skill development. The benefits of using presentations include: Engaging multiple learning styles

i. Increasing visual impact.
ii. Improving audience focus.
iii. Providing annotations and highlights.

This delivery method helps in attainment of PO1, PO2, PO8, PO10 and PO11.

- **Mth6 – Research Literature**

In addition to the text books/references mentioned for each course, the students are also exposed to the technical research content such as IEEE Xplore subscriptions and basic NPTEL platforms to enhance their knowledge and skills. They encourage the students to develop an attitude to pursue lifelong learning with high ends. This helps in attainment of PO1, PO2 and PO12.

- **Mth7 – Guest/Extension Lectures**

During the semester, experts from various domains of computer science & engineering are invited to deliver guest/extension lectures on the latest trends and developments. These lectures help the students to interact with the industry people and enhance their knowledge in the subject domain. The students are exposed to industry expectations as a professional to serve the societal needs. Hence, it helps in the attainment of PO6, PO7, PO11 and PO12.

- **Mth8 – Workshops**

In addition to the book sphere, the students are also given inputs like Workshops, at least once each semester, so as to keep them accustomed to latest technical spheres of engineering streams. These workshops encompass a wide range of topics and objectives, lending a hand to both, direct as well as secondary teaching aids.

Delivery Methods	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Mth1 – Lectures(Online/Offline)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Mth2 – Tutorial Sessions	Y	Y	Y	Y	Y	Y	Y		Y			
Mth3 – Laboratory Sittings/Virtual Lab Sessions	Y	Y	Y	Y	Y		Y					
Mth4 – Quiz/Assignment	Y	Y	Y	Y	Y	Y	Y				Y	
Mth5 – Presentations	Y				Y			Y	Y	Y	Y	Y
Mth6 – Research Literature	Y	Y		Y	Y	Y	Y					Y
Mth7 – Guest/Extension			Y	Y	Y						Y	Y
Mth8 – Workshops	Y	Y	Y						Y		Y	Y

Table-B.2.2.1f: Provides the course and their delivery methods with linkages to POs.

Mathematics and Basic Science	Mathematics I & II	Mth1, Mth2, Mth4	PO1, PO2,PO3, PO11
	Physics I & II	Mth1, Mth2, Mth4	PO1, PO2, PO5, PO6, PO7, PO10, PO12
	Chemistry I & II	Mth1, Mth2, Mth4	PO1, PO2, PO5, PO6, PO7, PO10, PO12
	Chemistry lab I & II	Mth1, Mth3	PO1, PO2, PO5, PO6, PO7, PO10, PO12
	Physics lab I & II	Mth1, Mth3	PO1, PO2, PO5, PO6, PO7, PO10, PO12
Engineering Sciences	Engineering Drawing	Mth1, Mth3	PO1, PO3, PO4, PO8, PO9, PO12
	Machine Drawing	Mth1, Mth3,	PO1, PO3, PO4, PO8, PO9, PO12
	Electronics I & Lab	Mth1, Mth2, Mth3, Mth4	PO1, PO2,PO7
	Basic Electrical	Mth1, Mth2,Mth4	PO1, PO2, PO3, PO4, PO5, PO6, PO11, PO12
	Engineering Mechanics	Mth1, Mth3,	PO1, PO2,PO11
Humanities and Social Sciences	Humanities I & II	Mth1, Mth5,	PO3, PO6, PO12
	Self-awareness and ethics	Mth1, Mth5	PO3, PO6, PO7, PO8, PO9,PO11,PO10,PO12
	Basic management principles	Mth1, Mth5	PO2, PO3, PO8, PO9,PO10, PO12

Professional Core	Introduction to Chemical Eng.	Mth1, Mth2, Mth 4, Mth5	PO1,PO2,PO3,PO5,PO6,PO7,PO8 ,PO11, PO12
	Material and Energy Balance	Mth1, Mth2,Mth4	PO1,PO2,PO3,POP4,PO5,PO6,PO 7,PO8,PO9,PO11,PO12
	Process Fluid Mechanics	Mth1, Mth2, Mth4, Mth5	PO1, PO2 , PO3, PO4, PO5, PO12
	Thermodynamics and Chemical Kinetics	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4,PO12
	Chemical Eng. Thermodynamics	Mth1, Mth2, Mth4	PO1,PO2,PO3,PO4,PO12
	Heat Transfer	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4, PO6, PO7, PO12
	Mechanical Operations	Mth1, Mth2, Mth 4	PO1,PO2,PO3,PO4,PO6,PO7,PO1 2
	Fluid Mechanical and Mechanical Operation Lab.	Mth1, Mth3, Mth4	PO1, PO2 , PO3, PO4
	Process Equipment Design –I	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO11, PO12
	Chemical Reaction Eng.	Mth1, Mth2, Mth4	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11, PO12
	Material Science & Technology	Mth1, Mth2, Mth4	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12
	Chemical Technology-I	Mth1, Mth5, Mth7	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO12
	Mass Transfer-I	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4, PO5, PO6, PO7, PO11, PO12
	Heat Transfer Lab	Mth1, Mth3,	PO1, PO2 , PO3, PO4, PO6, PO12
	Process Equipment Design-II	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4, PO5, PO6, PO7, PO9, PO11, PO12
	Mass Transfer-II	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4, PO5, PO6, PO7, PO11, PO12
	Chemical Technology-II	Mth1, Mth5, Mth7	PO1, PO3, PO4, PO5, PO6, PO7, PO11, PO12
	Energy Eng. Lab	Mth3, Mth1	PO1,PO2,PO3,PO4,PO5,PO6,PO7 ,PO8,PO9,PO10,PO11,PO12
	Energy Eng.	Mth1, Mth2, Mth5, Mth8	PO1,PO2,PO3,PO4,PO5,PO6,PO7 ,PO8,PO9,PO10,PO11,PO12
	Process Instrumentation	Mth1, Mth2, Mth5	PO1, PO2, PO3, PO4,PO5

	Transport Phenomenon	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4,PO5,PO6, PO7, PO8, PO12
	Thermodynamics & Reaction Eng. Lab	Mth3, Mth1	PO1, PO2 , PO3, PO4, PO6, PO11, PO12
	Industrial Training & Presentation	Mth5, Mth6	PO1. PO2.PO9,PO10,P012
	Chemical Process Safety	Mth1, Mth2, Mth8	PO1,PO2,PO3,PO4,PO5,PO6,PO7 ,PO8,PO9,PO10,PO11,PO12
	Process Dynamics & Control	Mth1, Mth2, Mth4	PO1, PO2 , PO3, PO4, PO5, PO6, PO7, PO8, PO12
	Process Dynamics & Control Lab	Mth3, Mth1	PO1, PO2 , PO3, PO4, PO5, PO6, PO7, PO8, PO12
	Process Economics & Plant Design	Mth1, Mth2, Mth4, Mth5	PO1, PO2 , PO3, PO4, PO12
	Biochemical Eng.	Mth1, Mth2	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, P09, PO10, PO12
	Mass transfer lab	Mth3, Mth1	PO1, PO2 , PO3, PO4, PO5, PO9, PO10, PO11, PO12
	Bio resource Technology	Mth1, Mth2	PO1, PO2, PO3, PO4,PO5, PO6, PO7,PO8,PO9, PO10, PO12
	Biochemical Eng. Lab	Mth3, Mth1	PO1, PO2 , PO3, PO4,PO5, PO9,PO7,PO8,PO11,PO12
	Modeling& Simulation in Chemical Eng.	Mth1, Mth2, Mth3	PO1, PO2 , PO3, PO4,PO5,PO6,PO12
	Industrial Pollution Abatement	Mth1, Mth2, Mth8	PO1, PO2, PO3,PO4, PO5, PO6, PO7
Computing	Computer Science Programming I, II	Mth1, Mth4, Mth8	PO1, PO2, PO3, PO4, PO5, PO12
	Computer Science Programming I, II Lab	Mth1, Mth3	PO1, PO2, PO3, PO4, PO5, PO12
Projects/Training/Seminar	Major Project	Mth1, Mth3 Mth5, Mth6, Mth7, Mth8	PO1, PO2, PO4, PO5, PO6, PO7, PO9, PO10, PO11, PO12
	Pre-Project/Viva	Mth3, Mth4, Mth5, Mth6, Mth8	PO1, PO2,PO3,PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
	Industrial Training	Mth4, Mth5	PO1, PO2, PO9, PO10, PO12
	Seminar	Mth4, Mth5	PO1,PO3,PO4,PO5,PO6,PO7,PO10,PO11,PO12

Table B.2.2.1g: Course Delivery Methods and Linkage to POs.

Conduct of Experiments (Observations in Lab)

- A lab manual is maintained in each laboratory.
- All the experiments in the prescribed syllabus is followed and completed by the end of the semester.
- The objective and the procedure for all experiments in the prescribed syllabus is available in the lab manual.

Continuous assessment in the laboratory

- Each student should maintain a rough record to record the details of work done in each laboratory session.
- The students are directed to write the step by step procedure to achieve a solution for the given experiment.
- The faculty-in-charge will check the procedure and then students can proceed with doing the experiment.
- Students should record the observations in the rough record while doing the experiment
- Students may also analyze the data to plot graph or other related work.
- The final output will be verified by the faculty-in-charge.
- Students should add the details of the experiments done in the laboratory to the prescribed record book.

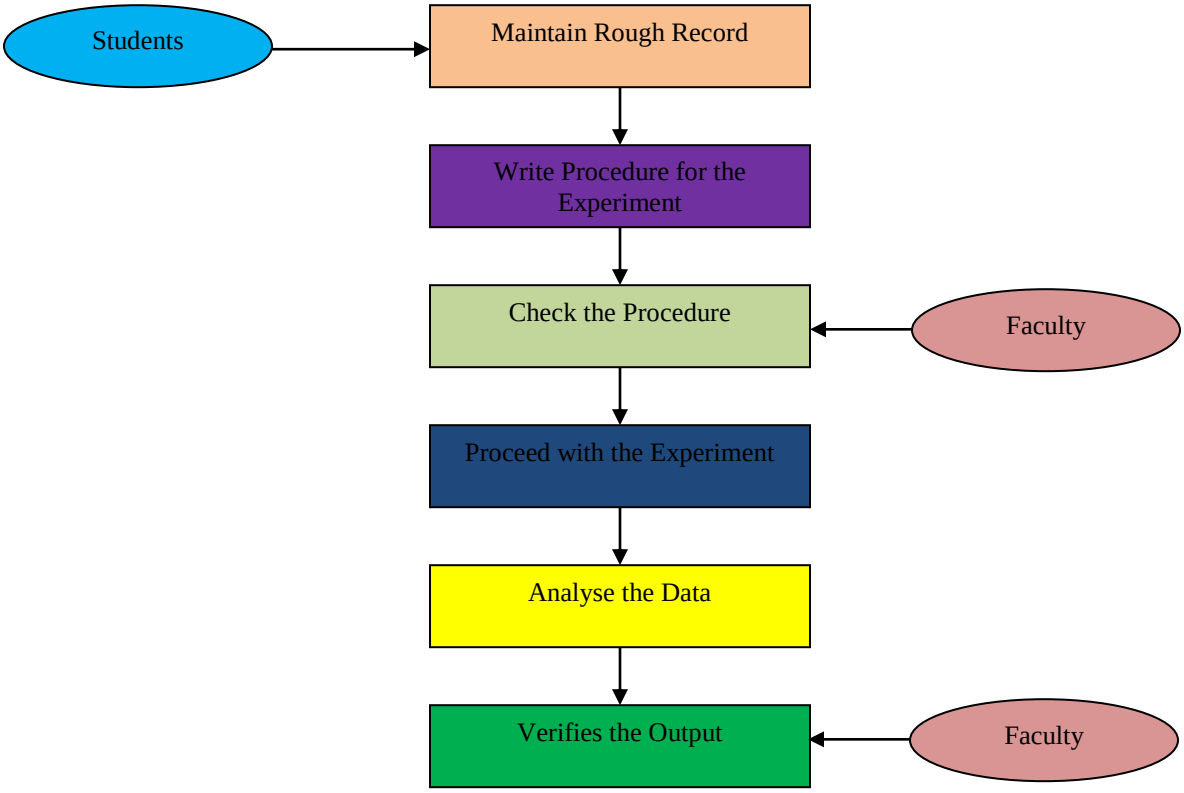


Figure B.2.2b: Process for conduct of experiments, record of observations and analysis of data

- The Laboratories are evaluated by the faculties for 100 marks based on their performance during the semester, internal test and record submission.

- The distribution of marks for laboratory subjects has been reflected in Table 2.2d.

Continuous Assessment	Major Examination	Total	Grade
40	60	100	.....

Table B.2.2.1h: Distribution of Marks for Laboratory Subjects

F. Impact Analysis

Student feedback of teaching-learning process and actions taken

Feedback collected for all courses: Yes

Process:

- At the end of each semester exam, feedback forms/Course Exit Survey forms on each subject are collected.
- Student Feedback is valuable for identifying areas for instructional improvement because simple changes can help motivate students and enhance student learning.
- The questionnaire is prepared covering all areas of faculty's including ability of teaching, quality of learning, class-handling attitude, acceptance authority by students, etc. where students are asked to record their opinion directly.
- If the overall feedback falls below 80 % corrective actions are taken.
- The Head of the Department will provide some suggestions for improvement based on the feedback if required.

Note: Percentage of students participating: 95-100%

COURSE APPRAISAL/FEEDBACK FORM

Course No & Title **Date:**

Instructor's Name **Sem:**

Please Tick In The Appropriate Box

S. No.	**Course Organisation**	Range	5	4	3	2	1	
1	Were the objectives and course plan clearly specified?	Very clearly excellent						Very Poorly
2	Was the course coverage and depth adequate?	Excellent						Very poor
3	Did the topics provide any new knowledge?	Mostly						Hardly
4	Was the prescribed study material readily available?	Very readily						Not available at all
	Presentation and interaction							
5	How were the lectures in terms of clarity and presentation of the fundamental concepts?	Excellent						Poor
6	Rate the audibility and articulation of the instructors or'2al presentation	Excellent						Poor
7	Did the instructor encourage think logically and objectively?	Very much						Never
8	Was the instructor's response to the questions	Very much						Not at all

	asked in the class satisfactory?							
9	Rate the instructor's attitude towards teaching of this course.	Enthusiastic						Indifferent
10	Were the classes held regularly and on time?	Always						Never
11	Rate the overall quality of teaching in this course	Outstanding						Poor
	Evaluation							
12	Did the examinations reflect the courses plan?	Very closely						Poorly
13	Were the examinations of appropriate level and length?	Always						Rarely
14	Were the answer script promptly checked and returned?	Always						Rarely
15	Was the grading fair and transparent?	Mostly						Rarely
16	Did the midterm evaluation and feedback improve the understanding of this course?	Always						Rarely

NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR (J&K)
DEPARTMENT OF CHEMICAL ENGINEERING
Course Exit Survey

Name of the Program:
Academic Year
Code and Title of the Course:
Semester:
Name of the Course Teacher:

Note: Please rate the quality of course on course curriculum, course organization, teaching learning process, quality of learning material, assignments, progressive assessments, performance of faculty members and course outcomes. Rate each applicable criteria by putting points as mentioned in legend.

S. No.	**Criteria**	**Rating**		
		Good (3)	**Average (2)**	**Poor (1)**
1	**Course Curriculum**			
	Course Outcome explained			
	Depth and breadth of course content			
	Importance of course explained			
2	**Course Organization**			
	Ease of learning			
	Logically sequenced			
	Linked with previous and subsequent courses			
3	**Teaching Learning Process**			
	Introduction of topic			
	Development of content			
	Opportunity of participation			
	Quality of questions asked by teacher			

	Variety of teaching materials			
	Use of teaching aids			
	Summarization of learning			
4	**Quality of Learning Material**			
	Relevance to course outcomes			
	Coverage			
	Comprehendible			
	Variety in learning material such as handouts, case study, papers, workbook, manual, ppts			
	Reference material			
5	**Assignments**			
	Relevance to course			
	Feedback provided on assignments			
6	**Progressive Assessment**			
	Relevance of progressive test			
	Feedback provided on assignments			
7	**Performance of Faculty members**			
	Effective communication			
	Guidance and feedback			
	Time management			
8	**Course Outcome Assessment**			
	CO1:			
	CO2:			
	CO3:			
	CO4:			
	CO5:			

- The quality of teaching exhibited in terms of attaining POs, PSOs to the extent of 70-80 % in most of the courses.
- When the academic outcome is more than 75%, most students have achieved their course outcomes within the stipulated time of four years.
- Because of the extra support given to the slow learners and the weak students, the pass percentage is continuously increasing and the number of backlogs students is decreasing.

2.2.2 Quality of end semester examination, internal semester Question papers, Assignments and Evaluation (15)

Claimed 15

A. Process to ensure the quality of internal semester question papers:

- All tests are conducted in strict adherence to the academic calendar.
- The question papers for each subject are set in such a way that it maps to the Course Outcomes of the respective subject.
- The question paper will be verified by the Head of the Department and may accept with or without modifications.
- The questions asked in each subject are categorized to knowledge, comprehension, application, analysis, evaluation and synthesis level.
- All course outcomes will be achieved through the tests conducted in each semester.

  - CO Coverage for Midterm Exams
  - CO Coverage for End term Exams
  - CO Attainment Calculation.

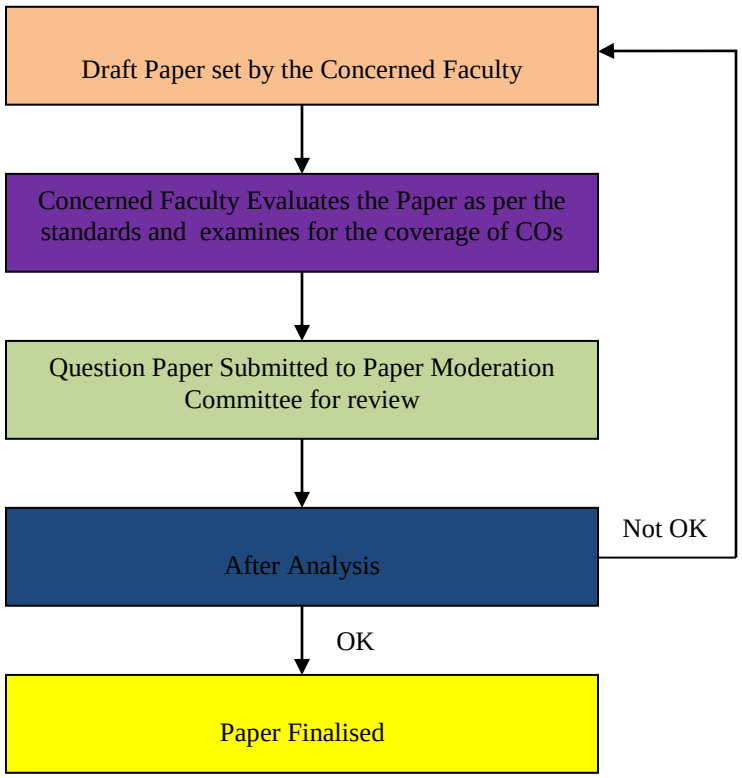


Figure B.2.2.2a: Process to Ensure the Quality of Internal Semester Question Papers

Paper Moderation Committee includes following members:

1) Head of the Department
2) Course Coordinator
3) Subject Expert

B. **To ensure the quality of the internal semester question papers the following process is adopted**:

- Regular midterm exams are held in strict adherence to the academic calendar of the institute.
- The question papers are set in such a way that the COs maps the questions asked.
- The question papers are examined and verified by the HOD to ensure the standard of the paper and ensures that the COs of the course are covered. The questions papers are modified if HOD is not satisfied with standard requirements of the question paper.
- The questions asked are well balanced to ensure that all the components such as knowledge, comprehension, application, analysis etc are encompassed.

C. To ensure the quality of the assignments following procedure is adopted:

- At least two assignments are given before midterm and after the midterm (before the commencement of the major exam)
- The assignments are designed to map the COs of the course.
- The assignments are designed to cover both theoretical and numerical portion of the course.
- The assignments cover knowledge, comprehension, application, analysis etc. of the course.
- The assignments may have questions designed by the faculty or an open book type.
- The evaluated assignments are returned to the students with the remarks of faculty so as to point out the mistakes.
- The marks earned by the students are displayed on the notice board for transparency so that the students come to know about the marks before final submission to the controller of examinations.

D. To ensure the quality of evaluation following procedure is place in the department:

- The scheme of evaluation and solution to the problems in the question papers are prepared by the respective faculty in advance.
- The CO coverage and the marks allotted are recorded by the faculty.

- The evaluated answer books are returned by the faculty to the students to ensure the transparency so that the students come to know about the marks before final submission to the controller of examinations.
- Student's feedback is received by the faculty regarding the evaluation of each question.
- The students are encouraged to discuss any doubt or discrepancy regarding the evaluation.
- The marks of the students are forwarded only when the students are satisfied with evaluation.
- It is the statutory procedure of the institute to show the evaluated answer books to the students , once the students give in writing the that they have seen the answer books . The marks are forwarded to the concerned quarters.

E. Process to ensure questions from outcomes/learning level perspective.

- For each subject, a tentative question list is prepared according to the COs.
- While setting the question paper, previous institute exam papers of at least three years are taken into consideration to avoid repetition of questions.
- While setting a question paper an attempt is made to follow Bloom's taxonomy. The questions are prepared according to the level of toughness (viz., analyzing the problems, implementation of modern tools, formulating the problems etc).

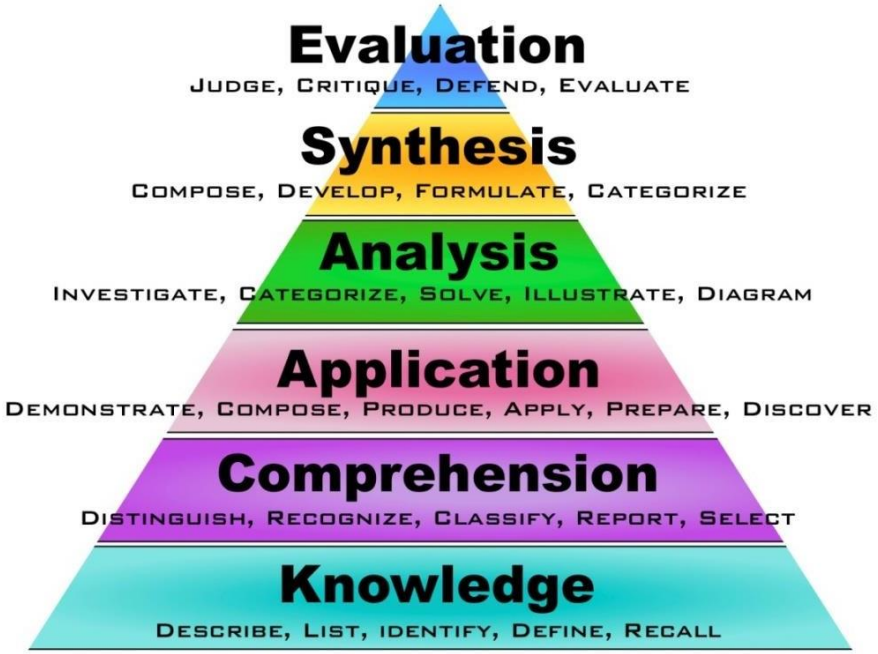


Figure B.2.2.2b: Bloom's Taxonomy Pyramid

- **The questions asked are of three categories:**

1) Approximately one third of the questions is of elementary level and can be answered by an average student, which require fundamentals of the course.
2) Approximate one third of the questions need analysis and use of content covered as per syllabus.
3) Remaining one third of the questions are based on advanced level. The solution of these questions/problems requires certain amount of critical thinking, analysis and knowledge.

MINOR EXAMINATION ANALYSIS/ QUESTION PAPER
Spring Semester (2019): Minor Examination

Subject: Energy Engineering (ChBC-64) **Maximum Marks: 30**
Answer all questions. **Time Allowed: 1h 30min**

CO1	Basic understanding about various energy sources and their significance with respect to energy and environmental sustainability.
CO2	Knowledge about the processing/generation of fuels and their significant characteristics for various applications.
CO3	Design of the systems for efficient fuel utilization and maximum recovery of heat
CO4	Understanding energy audits and management of the non conventional energy utilizing systems.

1. (a) A producer gas contains 8% CO_2; 1% C_2H_4; 15% CO; 5% CH_4; 12% H_2; 5% 0_2 and 54% N_2 (volume). When it is burned with air, the products of combustion contain 10% CO_2, 1% CO, 8% O_2, and 81% N_2. Calculate
   i. Volume ratio of air supplied to the producer gas burnt assuming both are at the same temperature and pressure
   ii. %excess air used. 06 CO2

   (b) Explain the various steps involved in production of producer gas. 04 CO2

2. (a) What are the various drives involved in petroleum recovery? 04 CO1

   (b) A byproduct coke oven produces 10,000 m^3 of gases per hour having the following analysis by volume: C_6H_6= 5%; C_7H_8=5%; CH_4=40%; CO=7%; H_2=35%; CO_2=5%; N_2=3%. The gases leaving the oven at 2 atm pressure at 350 ^{0}C. After cooling to 50^{0}C, benzene and toluene are completely removed by condensation. Calculate
   i. Average molecular weight of the gases leaving the oven and the condenser
   ii. Weight of gases leaving the oven and condenser
   iii. Volumetric composition of gases leaving the condenser
   iv. Weight of benzene and toluene condensed. 06 CO2

3. (a) Differentiate between fluidized bed combustion and fixed bed combustion. 03 CO1

   (b) In petroleum refining, differentiate between atmospheric residue and vacuum residue. 03 CO1

   (c) Briefly describe the methods of production of acetylene. 04 CO1

ASSIGNMENT: 1

CO1	Basic understanding about various energy sources and their significance with respect to energy and environmental sustainability.
CO2	Knowledge about the processing/generation of fuels and their significant characteristics for various applications.
CO3	Design of the systems for efficient fuel utilization and maximum recovery of heat
CO4	Understanding energy audits and management of the non conventional energy utilizing systems.

CO1: Project on most environmentally sustainable energy source: case study.
CO2, CO4: Explain nanotechnology energy and its significance.
CO3: Design a system for best recovery of waste heat from chemical and metallurgical processes.

MAJOR EXAMINATION ANALYSIS/ QUESTION PAPER
Spring Semester (2019): Major Examination

Subject: Energy Engineering (ChBC-64) **Maximum Marks: 60**
Answer any four questions. **Time Allowed: 3 h**

CO1	Basic understanding about various energy sources and their significance with respect to energy and environmental sustainability.
CO2	Knowledge about the processing/generation of fuels and their significant characteristics for various applications.
CO3	Design of the systems for efficient fuel utilization and maximum recovery of heat
CO4	Understanding energy audits and management of the non conventional energy utilizing systems.

1. (a) Describe the three types of geothermal power plants and state the advantages and disadvantages of each. 06 (CO1)
   (b) What is an energy audit report and its principle? Explain in brief the two main classifications of energy audit reports. 05 (CO4)
   (c) Describe the two commercial coke making processes. 04 (CO2)
2. (a) When pure carbon is burnt in air, some of it is oxidized to CO_2 and CO. If the ratio of N_2 to O_2 is 7.18 and the ratio of CO to CO_2 is 2, what is the percentage of excess air used. Exit gases contain only N_2, O_2, CO and CO_2. 06 (CO3)
   (b) Discuss the working principle of a pressurized nuclear water reactor. 05 (CO3)
   (c) Define the following:
      i. Flash point
      ii. Fire point
      iii. Pour point
      iv. Char value
      04 (CO2)
3. (a) Write down the principles, construction and the working of the solar cell. State the various generations of solar cells. 05 (CO3)
   (b) Describe with the help of diagram, the differences between a rotary cup burner and a swirling burner. 04 (CO3)
   (c) Write a short note on wind energy. Discuss the various advantages and disadvantages of wind generated electricity. 04 (CO1)

(d) Write down the Boudouard reaction and the Neumann reversal reaction. 02 (CO1)

4. (a) Write down the various methods of production of acetylene gas. Write down the industrial applications and advantages of using acetylene gas. 05 (CO3)

(b) Identify the major setbacks for utilizing nuclear fusion reactions as an alternative energy source. 05 (CO4)

(c) Thoroughly explain the production of hydrogen gas by steam reforming method. 05 (CO3)

5. (a) Discuss the production and composition of water gas. 05 (CO2)

(b) Design a biogas plant for a small dairy of 90 grown up cows and 40 calves. The following data are available for the design:

i. Average gobar available/cattle/day= 10 kg
ii. Average biogas available/kg gobar/day= 0.03 m^3
iii. Average percentage of solid in gobar= 18
iv. The bulk density of gobar, 1,130 kg/m^3
v. The maximum allowable capacity of a digester for a small plant=50 m^3
vi. Optimum ratio of gobar to water in the slurry=1:1

Calculate the following:

a) Height and diameter of the digester
b) Height and diameter of the gas holder and purifier 10
c) Dimension of the slurry mixing tank. (CO3)

MID-TERM EXAMINATION, SEPTEMBER 2018
MATERIAL AND ENERGY BALANCE ChBC-32
Class:3rd Max. Marks: 30

Qn .No.	Blooms Taxonomy	CO	Questions
1	Comprehension Knowledge	CO1	A gaseous mixture has following composition (By Volume); Methane 80 %, Ethane 10 %, Chlorine 8 % and Nitrogen 2 %. Find ; i) Composition in mole % ii) Composition in wt. % iii) Average molecular wt. iv) Density (Kg/m^3) at STP and at 30 ^{0}C and 740 mmHg. Specific Gravity at STP and at 30 ^{0}C and 740 mmHg (Given composition of air by vol. 21% O_2 and 79 % N_2).
2	Knowledge Application Evaluate	CO2	Convert 600 ft-lb_f/s into HP
3	Application	CO2	The efficiency **η** of a fan depends upon density **ρ** and viscosity **μ** of fluid, angular velocity **ω** and diameter **D** of rotor and fluid discharge **Q** .Express **η** in terms of dimensionless parameters .Use Buckingham's pi theorem.
5	Knowledge Application	CO1	Discuss the importance and formulation of material balance calculations with reference to a cement plant.

END TERM EXAMINATION, NOVEMBER 2018
MATERIAL AND ENERGY BALANCE ChBC-32
Class: 3rd Max. Marks: 60

Qn .No.	Blooms Taxonomy	CO	Questions
1	Knowledge	CO1	Write the steps to be followed in material balance calculations.
2	Knowledge Application	CO1	A gaseous mixture has following composition (By Volume); Methane 80%, Ethane 6 %, Propane 8 % and Nitrogen 6 %. Find ; Composition in wt. % Average molecular wt. Density in Kg/m^3 at STP. Density in Kg/m^3 at 30 ^{0}C and 740 mmHg.
3	Knowledge Application	CO2	What is the criterion of selection of repeating variables in Buckingham Pi Theorem?
4	Comprehension Application	CO3	An aqueous solution of Na_2CO_3 (Mol wt. 106) is containing 25 % carbonate by weight .90 % of carbonate is recovered as Na_2CO_3.10 H_2O by evaporation of water and subsequent cooling to 278 K. The solubility of Na_2CO_3 at 278 Kis 9.5 kg. Na_2CO_3 per 100 Kg. of water. On basis of 100 Kg. of solution treated. Determine the following a. Quantity of crystals formed b. Amount of water evaporated c. Amount of mother liquor obtained.
5	Application	CO3	Draw schematic diagram of a triple effect evaporator and write the general material balance equations for this.
6	Comprehension	CO1	A combustible gaseous mixture has following composition by (wt. %);CO 25 %, CO_2 4 %, O_2 0.4 % and N_2 70.6 %.The gas is burned with 10 % excess air .If combustion is only 97% complete. Calculate; i) The composition in Vol. % of gaseous products formed per Kg of gas burned. ii) The composition in Wt. % of gaseous products formed per Kg of gas burned iii) Average molecular Wt. of product gaseous mixture.
7	Application	CO4	Show that under ideal conditions mole % of a gaseous mixture corresponds to Vol. %.
8	Application	CO2	Calculate the standard heat of formation of liquid Methanol ,given the standard heat of combustion of liquid Methanol is -726.55 kJ/mol and the standard heat of formation of gaseous CO_2 and liquid H_2O are respectively -393.51 and 285.84 kJ/mol.
9	Knowledge Comprehension	CO3 CO4	Write short notes upon the following; i) Specific heats of solids and liquids (Comparison) ii) Theoretical flame temperature(TFT) iii) Kopps Rule iv) Hess's Law of constant heat summation

Total CO attainment is calculated taking 40% of internal assessment and 60% of end term assessment and overall CO attained is the average of total attainment.

- Total Attainment = 0.4*(Internal Assessment) + 0.6*(End term Exam)
- Overall CO attainment for a particular course = Average of Total Attainment

Formula for calculation of PO attainment:

PO1 = Matrix product (Row of course attainment matrix and Column of that particular PO column of CO-PO matrix) / (No. of COs of that course * maximum PO attainment level).

e.gPO1 = (3*3+2.2*3+2.6*3+2.6*3+2.6*3)/ (6*3)

NOTE: The same formula has been used in criteria 3 for calculating the attainment values of POs.

Evaluation process: course work

Evaluation Process- Class test/ mid-term test schedules and procedures for systematic evaluation, internal assessments.

Assessment is based upon the efficacy process being followed.

Evaluation process and test schedules are all followed and monitored in accordance to the guidelines of academic section of the Institute as follows.

Mid term	Assignment	End semester exam	Grand total
30	10	60	100

But for the academic year 2019-2020 it had been differed due to abrogation of Article 370 and subsequent COVID-19 lockdown, the following evaluation schemes were adopted.

Autumn 2019:

Assignment	End semester exam	Grand total
10	90	100

Spring 2020:

Maximum SGPA in Previous Semesters	Assignments as Mid Term Examination	Comprehensive Viva-Voce Examination	Grand total
30	30	40	100

Grading criteria (Absolute Values)

A+	A	B+	B	C+	C	D
>90	81-90	71-80	61-70	51-60	40-50	<40

Seminar and Presentation Evaluation

Assessment is based upon the methodology being followed and its effectiveness

A group of teachers along with Seminar coordinator evaluate the performance of students based on their presentation and viva-voce examination as per below format.

S. No.	Student Name	Seminar Report (40)	PPT Preparation (20)	Viva and Presentation (40)	Total Marks (100)	Grade

Mechanism for addressing evaluation related grievances

Assessment is based upon the efficiency of the mechanism being followed.

- A transparent evaluation mechanism is followed as the answer sheets of mid-term examinations are shown to the students one week after the exam (date as mentioned in the institute academic calendar).
- The grades are displayed on the notice board prior to its finalization and submission to the controller of examination.

2.2.3 Quality of student projects (20) **Claimed 17**

A. Process for identification of students projects

The process for project identification by students, guide allotment, continuous monitoring and evaluation are elaborated as:

B. Identification of projects and allocation methodology to Faculty Members

- The department assigns the job of monitoring of students projects to one of the senior faculty member known as project coordinator.
- The student's project activity starts at the commencement of the 7th semester.
- Students are divided into groups of maximum of 3 students.
- The students choose their supervisor and topic as per their field of interest so that the students explore their talent.
- There is no compulsion at the departmental level regarding the choice of supervisor or topic, however sometimes project coordinator may change the topic and assign new supervisor to balance out the project load among all the faculty members of the Department.
- This students frame the groups having the similar interests.
- The project proposal is submitted to the prospective supervisor for his perusal. Depending upon the feasibility of the proposal it is further submitted to the project coordinator for approval. The proposal includes a summary and the breakup of the cost of project.
- After Project coordinator's approval, the students start the literature survey to clearly define the problem and design of the project.

Project COs

CO1	Apply the knowledge of chemical engineering to design or fabricate a system.
CO2	Identify chemical engineering research problems.
CO3	Apply knowledge of chemical engineering to solve energy and environmental problem.
CO4	Ability to write a research proposal.

The project proposal is evaluated as per the following scheme:

Criteria	**Marks**
Project Report	50
External Viva	25
Presentation	25
Total	**100**
Project Evaluation Committee Criteria Marks Awarded	

Table B.2.2.3a: Process for Continuous Monitoring of Student Projects

Students are directed to maintain a project diary to record the activities on day to day basis regarding the project work. The record includes the details of their interactions with the project supervisor. The Project evaluation committee and the project guide together analyzes the nature of the project during the different stages of evaluation and make sure that the work is environment friendly, ensures safety, ethics and is cost effective.

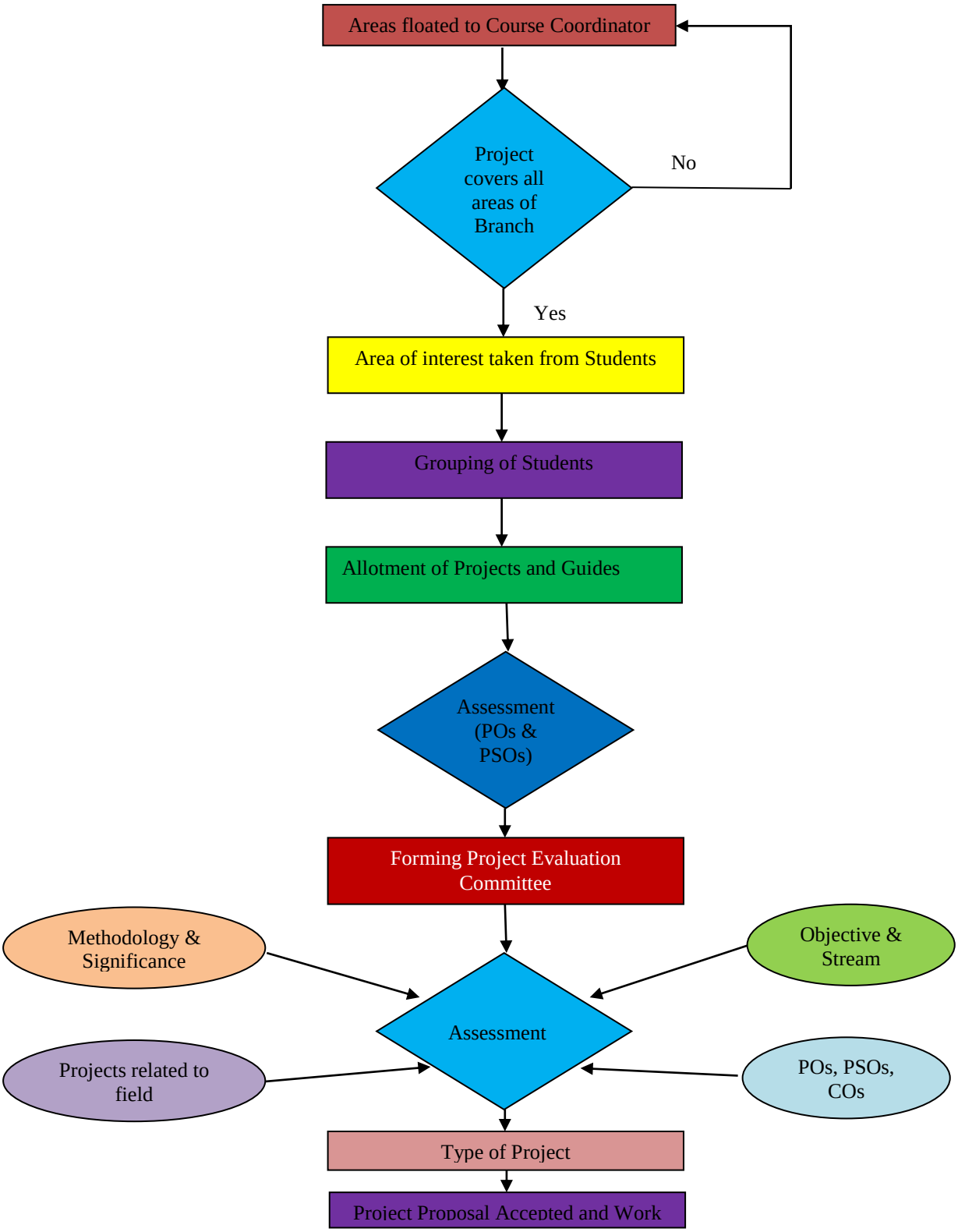


Figure B.2.2.3a: Flow Diagram of Project Report

C. Process to ensure the quality of student projects

- The Project evaluation committee and the project guide together will analyze the nature of the project during the different stages of evaluation and make sure that the work is environment friendly, ensures safety, ethics and is cost effective.
- The projects are classified into different areas and their relevance to PO's and PSO's are identified to ensure its quality.

D. Process for Evaluation and Monitoring

To ensure the foolproof monitoring and evaluation of the Student projects following is done:

- The project work is divided into small components.
- Each component of the work is assigned to each student in the group.
- The supervisor maintains a diary regarding the work carried out by the students working under him.
- The supervisor interacts periodically usually after 1 week with the students to determine the progress and to evaluate the contribution of each student.

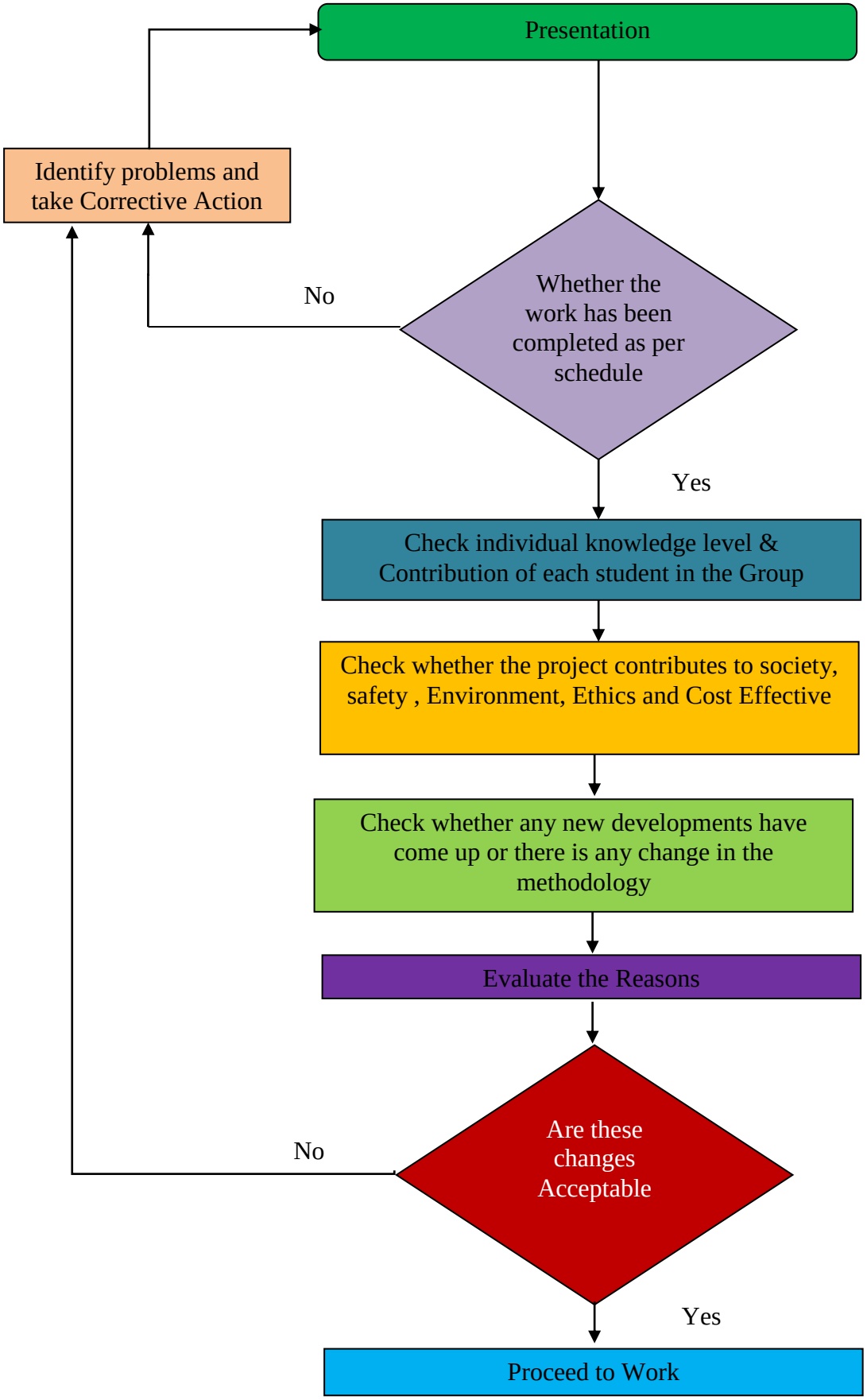


Figure B.2.2.3b: Process for Monitoring of the Student Project

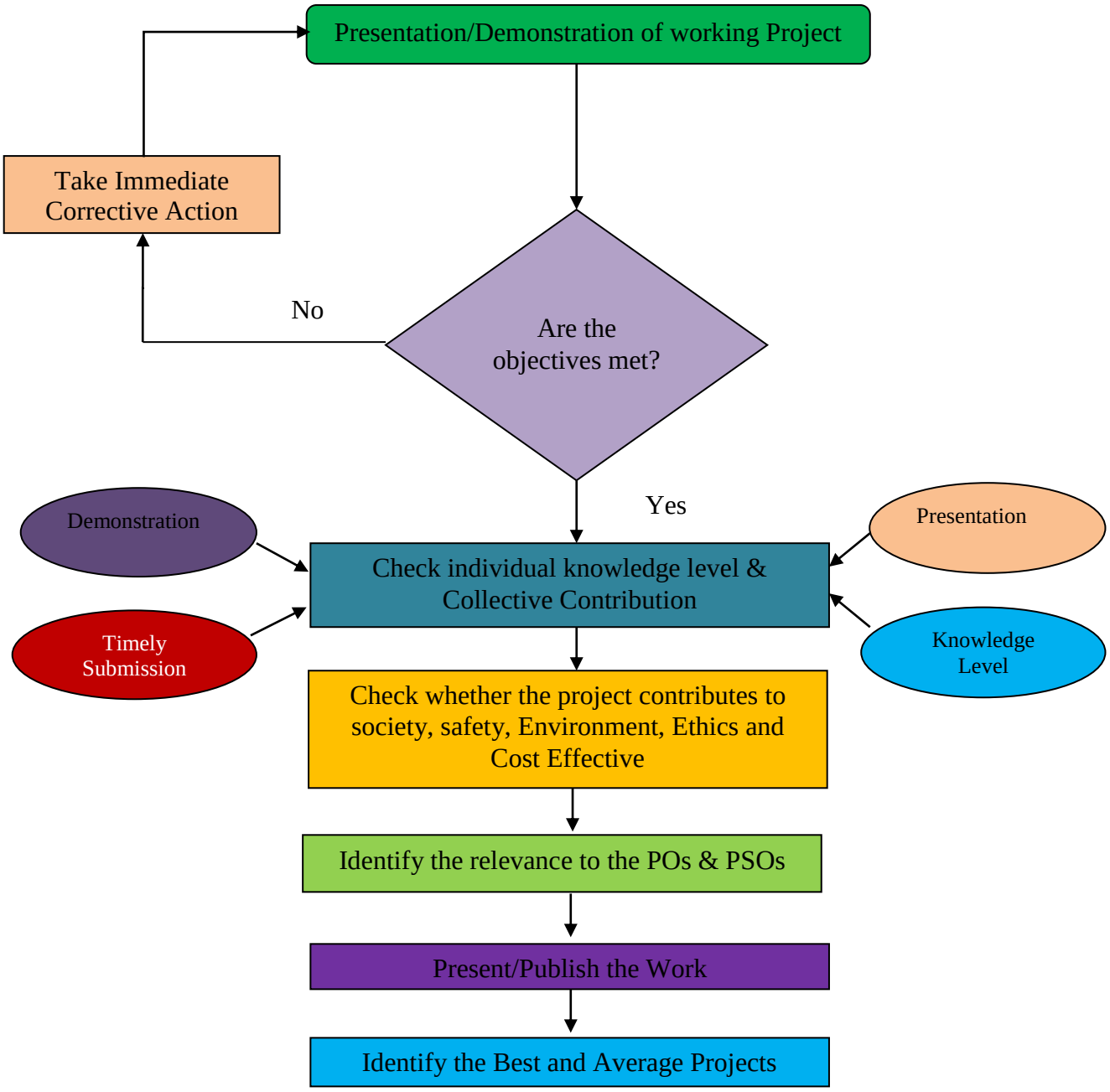


Figure B.2.2.3c: Evaluation Process of the Student Project

- Members of the project group prepare and submit their report.
- The report records all aspects of the work, highlighting all the problems faced and the approach/method employed to solve such problems.

E. Project Related to Industry

There were no projects related to industry.

F. Process of Evaluation

- The Departmental project evaluation committee meets twice in the 7th and 8th semesters to assess the progress of the projects.
- The departmental Project evaluation committee and the project guide together will analyze the nature of the project during the different stages of evaluation and make sure that the work is environment friendly, ensures safety, ethics and is cost effective.
- Students, with the help of project guide should publish their work in relevant journals.

G. Process to assess Individual and Team Performance

As has been stated above, the students remain in constant touch with the supervisor. During their interaction the supervisors enquire from the group members about the progress of the work. This process helps the supervisor to determine the performance of the individual and the team. The students are awarded marks based on participation during the sessions with the supervisor so that none of the students lag behind and can perform well both individually and on a team scale. Individual learning and performance is assessed in the following ways-

- Some faculty members add an individual component to group projects (e.g., a short essay, journal entries); some combine a group project with an individual test or quiz. Both group and individual performance are then reflected in the total project grade (e.g., some faculty members make the group grade worth 50% and the individual grade worth 50%; others split it 80%/20%. There's no perfect breakdown, but the grading scheme reflects goals for student learning.

H. Quality of Completed Projects/Working Prototypes

To ensure the quality of the student projects, following steps are taken at the Departmental level:

- A departmental committee is constituted comprising of all supervisors as members and HOD as chairman. At the end of 7th semester students are advised to present the work completed so far in front of the committee. This work is evaluated for one credit point.
- Each group presents the content of work they have completed by PPT. The presentation is followed by the question-answer session. Based on the question answer session marks are awarded to the students.
- The committee also advises the students regarding the deficiencies or modifications in the project and accordingly the students incorporate the possible changes in their project work.
- The final exam of the project work is held at the end of the 8th semester.
- A committee constituted by the HOD and approved by the director, comprising of the departmental members, an external member of the sister department (nominated by the director) and HOD as chairman examines project.

- A presentation is given by the students one by one in the group in front of the committee which is followed by the question - answer session and the examination of the prototype developed.
- The committee members record the marks awarded to each student which are then submitted to the HOD and final award is arrived at after adding the awards recorded by project coordinator during midterm evaluation.

List of good major projects for the academic years along with their relevance to the Pos and PSOs , Safety , Environment and Cost is shown in **Table B.2.2.3b:**

S. No.	Project Title	Project	Area	Contribution	Relevance to POs and PSOs	ENVIRONM	SAFETY	ETHICS	COST
1.	Modelling of Methanol Crossover In DMFC	Good	Fuel cells	• A mathematical model for methanol crossover of direct methanol fuel cell (DMFC) is presented. • The activity of the proton generation reaction of methanol becomes low and the DMFC performance reduces in the high current density region because the concentration of methanol solution of 1M is too low.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO12, PSO1, PSO2, PSO3.	Y	Y	Y	Y
2.	Production of 100 Tons Per Day of Pure Hydrogen Gas From Refinery Off Gas Stream	Good	Energy	Technology of production of pure hydrogen gas from refinery off gas stream Simulation of production process	PO1, PO2, PO3, PO4, PO5, PO6,, PO9, PO10, PO12	N	Y	N	Y

3.	Effect on Mixing of Fluid Streams in a Micro Channel	Good	Microchannels	• Numerical analysis has been carried out to investigate the effect on mixing of the position of the fluid stream interfaces in a rectangular microchannel. Both single- and two interface fluid streams have been considered for study at various Reynolds numbers • Design of microfluidic devices studies includes, understanding the effect of mixing in micromixers and the mechanism of the mixing of fluid streams.	PO1, PO2,PO3, PO4,PO5, PO7, PO9, PO10, PO12	Y	Y	N	Y
4.	Preparation and characterization of acetalized poly (vinyl alcohol) based hybrid organic-inorganic Nano composite polymer membrane embedded with SiO_2 nanoparticles	Good	Membrane science	• Acetalized PVA based membrane incorporated with silica nano particles was successfully prepared. • The acetalization of the membrane and incorporation of silica promises better membrane stabilities. Such membranes could be industrially very useful for the separation of the effluents like surfactants and dyes in high temperature and variable PH feeds.	PO1, PO2, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y

5.	Fouling of cation exchange membrane	Good	Ion Exchange Membranes	• Fouled membranes such as selemion CMV and Ralex CMH membranes were treated with acid (HCl and H_2SO_4 • Results showed that right conc of HCl serves good agent for removing foulants from the membrane.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y
6.	Development of ion exchange membranes ZrW/PVA and SnP/PVA for Direct methanol fuel cell.	Good	Membrane and Material	• Cation exchange membranes were successfully prepared by incorporating Inorganic material into polymeric matrix. • Electrochemical properties such as transport number, ion exchange capacity and proton conductivity were determined.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y
7.	Production of bio diesel from sun flower seeds	Good	Energy	• Physicochemical characterization may be useful in extraction of bio diesel from the sunflower seed.	PO1, PO2, PO3, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y
8.	Modelling and simulation of sorbose production by fermentation.	Good	Biochemical	• Identification of the mathematical representation of the process which may be helpful for bioprocess development on sorbose production by fermentation.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y
9.	Modelling of pyrolysis of biomass	Good	Biomass conversion	• Characterization techniques studied. • Kinetic parameters evaluation through various models.	PO1, PO2, PO3, PO5, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y

10.	Characterization of locally available biomass	Good	Energy	• Characterization of biomass may be helpful in utilization of the locally available biomass wastes such as walnut shells for energy generation.	PO1, PO2, PO6, PO7, PO9, PO10, PO12	Y	Y	Y	Y
11.	Brand analysis of various cements in the state of J&K (India)	Good	Environmental Engg.	• Quality assessment of various brands of cement (OPC-43 grade) available in J&K. • Quality assessment facility for cement, developed in the lab (analytical).	PO1, PO2, PO6, PO7, PO8, PO9, PO10, PO12	Y	Y	Y	Y
12.	Power law fluid flow and heat transfer around a circular cylinder in laminar flow regime.	Good	Computational fluid	• Covers wall effect on the steady forced convection heat transfer characteristics of incompressible power law fluids from an isothermal circular cylinder. • All engineering parameters like drag coefficients, Nusselt number etc. have been studied.	PO1, PO2, PO4, PO6, PO9, PO10, PO12	Y	Y	Y	Y
13.	Isobaric vapor liquid equilibrium data of binary mixture	Good	Multiphase	• Data was generated for o-xylene and p-xylene that will be helpful for the separation of O-xylene and p-xylene.	PO1, PO2, PO4, PO6, PO9, PO10, PO12	Y	Y	Y	Y
14.	Water pollution modelling of dal lake using QUAL2K	Good	Environmental engineering	• QUAL2K model for river and water quality was applied to predict the water quality and environmental capacity of Dal Lake. • Results showed that NH3-N, TN and TP pollution loads of river needs to be reduced by certain amount (percentage) to satisfy the water quality objectives.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO12	Y	Y	Y	Y

15.	Enhancement of heat transfer in helical coil heat transfer using nano fluids	Good	Heat transfer	• Heat transfer is enhanced using nano fluids in the helical coil heat exchanger. • Various parameters like Nusselt number, friction factor, pressure drop characteristics and performance was standard	PO1, PO2, PO3, PO4, PO6, PO9, PO10, PO12	Y	Y	Y	Y
16.	Hydrothermal carbonization of PotamogetonCrispus into solid fuel	Good	Energy	• Weed from Dal Lake was subjected to high thermal carbonization to form solid biofuel known as hydro char. • Biofuel has huge potential to serve as an alternative fuel.	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO10, PO12	Y	Y	Y	Y
17.	Characterization of Almond Hulls	Good	Bio resource Technology	The proximate and ultimate analysis was encouraging for thermo chemical conversion. The thermal degradation behaviour was studied using thermo-gravimetric analysis. The functional characterization of almond hull was carried out using FTIR. Scanning electron microscopy analysis indicated the rough, fibrous texture and heterogeneous structures of biomass. Further, the X-ray diffraction analysis showed the crystalline structure. Presence of fermentable sugars was also confirmed by XRD and FTIR. The characterization revealed that almond hulls may be used as a potential candidate for energy generation through thermo-chemical conversion processes.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO12 PSO1, PSO2, PSO3	Y	Y	Y	Y

Table B.2.2.3b: Types and relevance of the projects and their contribution towards the attainment of POs and PSOs

I. Evidences of Papers Published /Awards Received by Projects etc.

S.No.	Name of the Journal	Students	Paper Title	Guide
1.	Journal of Energy Research and Environmental Technology	Aqib Ashraf, Aamir Suhail Khatana, Hindaal Mustafa	Modification of CO_2 Capture Techniques by Carbon Nanotubes: A Review Volume 5, Issue 3, pp 86-88, 2018	Dr. Malik Parvez Ahmad

Table B.2.2.3c

2.2.4 Initiatives related to industry interaction (10) **Claimed 8**

Industry Institute interaction continuously supply input to better teaching-learning processes, create awareness of industrial environment among the students, provide real practical knowledge to students and may boost self-confidence for some to even become entrepreneurs.

A. Industry supported laboratories

There is no lab supported by industry.

B. Industry involvement in the program design and Curriculum

As has been stated in the process for designing the program curriculum (2.1.1) an important feedback is sought from industry where the students get employed so that the performance of the students is enquired. Depending upon the performance as revealed by the feedback of the employer necessary changes are made in the curriculum
In light of the vision and mission of the department, industry involvement in the program design and curriculum are based on following surveys-

Chemical Engineering Department **National Institute of Technology, Srinagar** **INDUSTRY FEEEDBACK FOR CURRUCULAM DESIGN**	
The purpose of this survey is to obtain Employer's input on the quality of education of undergraduate programs in NIT, Srinagar. Your sincere cooperation would enable us to improve the quality of our graduates as per your requirements	
Name of Company/ Organization	

Mailing address			
Sector Private/Public/Academia			
What are the pertinent employability skills to stay updated in current industry trends and thereby improve the quality of the undergraduate program?	Logical Thinking	Good Aptitude	Excellent Communication

Rate NIT Srinagar Graduates working in your organization using the following criterion.
Put tick mark Knowledge, Skills, Abilities, Attitude and other Attributes expected out of NIT Srinagar graduates.

No.	**Overall, are you satisfied with**	**Excellent (3)**	**Good (2)**	**Satisfied (1)**
1	Capacity for development and analysis of engineering problems and formulation of appropriate solutions, retaining professional and ethical responsibilities.			
2	Aptitude for self education, ability to learn new skills and a clear appreciation for the value of life-long learning to update professional knowledge.			
3	Understanding professional engineering solutions for sustainable development and their application in global, national and societal contexts.			
4	Competence for acquiring new skills and applying them in research and development.			
5	Fundamental knowledge in mathematics and electronics science and professional fluency in English both communicative and technical forms.			
6	Dexterity in differentiation of management techniques and possession of leadership skills that enable successful function of multi-disciplinary teams.			

C. Industry involvement in partial delivery of any regular courses for students

To promote good Institute-Industry Interaction for our Institute, following schemes have been undertaken.

- Providing industrial training and other inputs to teaching-learning processes so as to develop awareness about the job functions in the industry among students.
- Arranging visits for students to various industries.
- Engineers from industry to deliver lectures.

Organizing workshops by Industry/Institute Experts summarized in Table B.2.2.4a:

Sl. No.	Venue	Domain Area of Curriculum Covered	Topic	Resource Person	Designation
1.	Hi-Tech Room	Environmental engineering	Environmental issues	Mr. Kaisar Parvaiz	General manager (J&K cement industry)
2.	Hi-Tech Room	Energy and Environmental Eng.	Microalgae based industrial effluent treatment and restoration of polluted water	Dr.V. Sivasubramanian	Director, PERC, Chennai
3.	Hi-Tech Room	Fuels	Alternative fuels- future perspectives	Dr. V.C. Srivastava	IITRoorkee (Chemical Eng.)
4.	Hi-Tech Room	Fuels	Plasma Technology for Biomass	Dr. Vimal Kumar	IITRoorkee (Chemical Eng.)
5.	Hi-Tech Room	Environmental	Dal is calling	Dr. ShafiqaPir	Technical Officer LAWDA
6.	Hi-Tech Room	Energy	Bio Diesel	Dr. Anantharanman	NIT Trichy
7.	Hi-Tech Room	Refinery	Petroleum Refinery	Er. Junaid Ashraf Shah	Production Engr. IOCLHaldia Refinery

Table B.2.2.4a

D. Impact analysis of industry institute interaction and actions taken thereof

- Interaction between the student and the industry improves upon the attitude, knowledge and skills, such as to fit any desirable organization in the future.
- The ability to apply engineering knowledge is improved by the internship program since it provides a platform to apply theoretical knowledge learned in the classroom practically.

- Practical knowledge is improved, which in turn helps to elevate their career opportunities.
- Placement opportunities are improved.
- The effectiveness of this practice can be gauged by the great response of the participants for the workshops.
- The feedback is obtained from the students at the end of 8th semester to assess the achievement of the objectives of the industrial training/ summer training/internship/ industrial tour.

2.2.5 Initiatives related to industry internship/summer training (10) **Claimed 10**

A. Objectives

- Internship is introduced to expose students to practical working environment
- It exposes the students with industrial /real time problems.
- It helps the students in solving/understanding real-life problems through application of engineering analysis, design, evaluation and creation.
- It changes the behavioural aspects of student to better cope with industrial environment.
- It provides a good platform for job training and develops a network for students which can be useful in enhancing their career prospects.

B. Initiatives

- Identification of relevant Chemical Engineering industries by communicating with the companies through stake holders.
- Inviting the companies for internship cum placement drive.
- Orientation by HOD and directorate of Internships before sending students to various industries.
- Distribution of Internship manuals and Internship Allotment orders to the students.

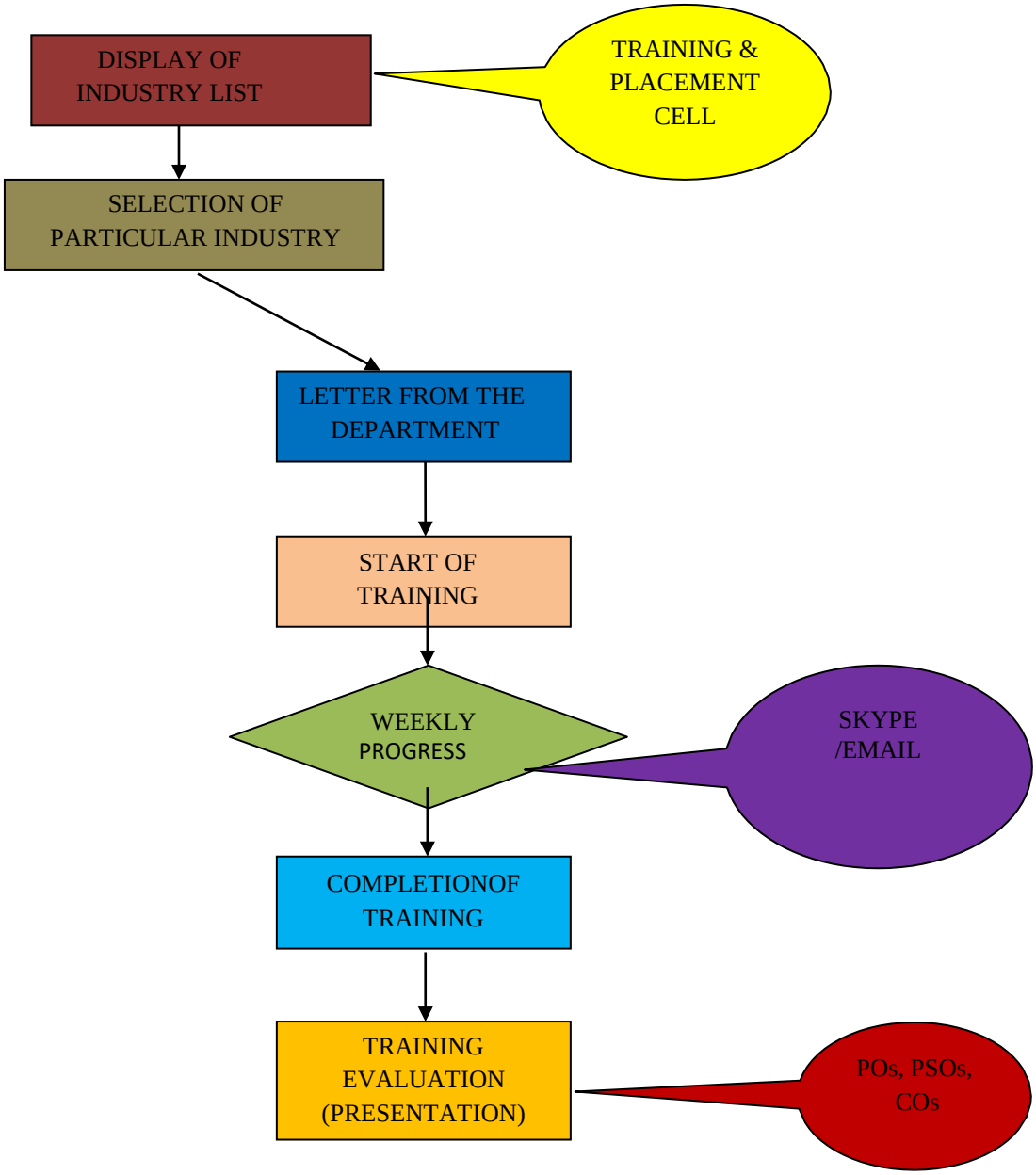


Figure B.2.2.5a: Industrial Training Process

C. Industrial training/tours for students

The faculties of the Department constantly try to interact with industries like BARC, JK Cements and Khyber Cements Khonmoh etc. for industrial visits of the students.

D. Industrial/internship/summer training of more than two weeks and post training Assessment

The main objective of interaction between the industry and institute is to improve the quality of technical education adequately to meet the needs of the industry and economy. Internships offer students a practical experience in the industry relating to the field of study. The bridge between industry and academic institute prepare engineering students for jobs in multinational companies by exposing them to new technology and engineering methodologies.
Some of the interactions are listed below:

- All the students have to undergo a six week industrial training before 6th semester.

2017-2021 Batch				
Sl. No.	**Name of Student**	**Area of Training**	**Name of Industry**	**Duration**
1.	Sandeep Singh Tomar	Drilling of coal Bed Methane	ONGC	30 Days
2.	Rajeev Kumar	Pollution Control Research Institute (PCRI)	Bharat Heavy Electricals Limited, Haridwar	30 Days
3.	Abhishek Verma	Testing of Petroleum products.	IOCL	56 Days
4.	Sobiya Ashraf	Manufacturing of cement.	Jammu and Kashmir Cements Limited	28 Days
5.	Berjees Naseer Ahangar	Entire process	Trumboo Cement Industries (TCI)	30 Days
6.	Kanak Garg	General Management and Food Quality Check	Nestle India Pvt. Ltd.	31 Days
7.	Yenugula David Venkat	Refinery and Petrochemical Engineering	Indian Institute of Chemical Engineers(IIChE)	30 Days
8.	Himanshu Kumar	Production	IOCL Barauni Refinery	31 Days

		Department		
9.	Manu Dogra	Chemical Engineering Division & Current Good Manufacturing Pilot Plant (cGMP)	Indian Institute of Integrative Medicine,(Council of Scientific and Industrial Research) Canal Road, Jammu (CSIR-IIIM Jammu)	31 Days
10.	Debasmita Mondal	Metlab	ALTCC GAZIABAD	21 Days
11.	Himani Bhagat	Jammu	LPG bottling plant-IOCL	42 Days
12.	Lavanya Rajoria	FABRICATION DEPARTMENT	BHARAT ELECTRONICS LIMITED	28 Days
13.	Akash Kumar	water treatment	UPRVNL	28 days
14.	Abhishek Bharati	High density polyethylene and linear low density polyethylene	GAIL	28 Days
15.	Vangara Pavan Kumar	emulsion polymerization in micro-reactors and CFD	CSIR-IICT HYDERABAD	60 Days
16.	Amoldip Singh Narang	HVAC and Research and development	Bharat Petroleum Corporation	30 Days
17.	Mohd Zakariya Farooqi	Research Intern	Indian Institute of Technology Delhi	40 Days
18.	Pramod Kumar	Air ,water and soil analysis	BHEL HARIDWAR	28 Days

19.	Ashish Kumar Jha	Air, water and soil analysis	Pollution Control Research Institute, BHEL, Haridwar	30 Days
20.	Junaid Farooq	Pulwama	JKCEMENTS	30 Days
21.	Suhail Kumar	Air, water and soil analysis	BHEL HARIDWAR	30 Days
22.	Shivam Spolia	Air,Water &Soil analysis	B.H.E.L	31 Days
23.	Sachi Singh	Jharkhand,Bokaro	SAIL,steel authority of india limited.	28 Days
24.	Junaid Farooq Pandit	Cement production process	JKCEMENTS	56 Days
25.	Manish Saini	Gas Cracker Unit	GAIL AURAIYA U.P.	28 Days
26.	Sachi Singh	Jharkhand,bokaro Bihar,kahalgaon	SAIL NTPC	28 Days 30 Days
27.	Poornima Gupta	Product department	IOCL Barauni Refinery Bihar	30 Days
28.	Sharyar Jeelani	Foods and Beverages	FIL Industries Private Limited	30 Days
29.	Anand Dadoriya	GPU(GAS PROCESSING UNIT)	GAIL(India) Limited	28 Days
30.	Vikas Kumar	air water and soil analysis	bharat heavy electricals limited haridwar	28 Days
31.	Yawar Ahmad Sheikh	Industrial Training Programme	ALTTC Ghaziabad	28 Days
32.	Anshika	Chemical	BSNL Ghaziabad	28 Days
33.	Yasmeena Ashraf	Whole industry	FIL industries limited	30 Days

34.	Imtiyaz Zahoor	Cement manufacturing	JK CEMENTS LTD. , FIL INDUSTRIES	30 Days 30 Days
35.	Pritee Kumari	Production	Indian Oil Corporation Limited	28 Days
36.	Imtiyaz Hussain	Ghaziabad, UP	ALTTC Ghaziabad	28 Days

Table B.2.2.5a: Details of Industrial Training attended by Students for year 2019-2020

2016-2020Batch				
Sl. No.	**Name of Student**	**Area of Training**	**Name of Industry**	**Duration**
1	Nikhil Singh Pradeep Manhas	Coke Oven Gas	Rourkela steel plant, SAIL	15 Days
2	Siddharta Gupta		HAL, Lucknow	30 Days
3	Juwala Kumar Siddharta Gupta Ravi Verma AmanThapa Mir FazaL	Ammonia production plant	NFL, Nangal	30 Days
4	Jai Prakash Singh	Ethanol production from molasses	Indian Glycol Ltd, Kashipur, Uttarakhand	35 Days
5	Ashish Raina Nikhil Singh	AVU, FCCU, VBU, CCRU	IOCL Mathura	29 Days
6	AyehsaGupata	Petroleum Industry (R&D)	IOCL, Boroni	28 Days
7	Neeraj Kumar Ashish rana	Adhesive	Adhesive Pedilite, Himachal Pradesh	30 Days

8.	ShehlaNazir	R&D	FIL Industries Ltd, Rangreth	30 Days
9.	Deepesh Kumar Haroon Rashid Muneeb Bashir	Field Orientation and GSUA optimization	ONGC, Gujarat	30 Days
10.	ShubhamSinghal Akash Thakur	Ion exchanger resin	DRDO, Jodhpur	30 Days
11.	Madihafarooq	R&D	FIL Industries Ltd, Rangreth	60 Days
12.	MeenakshiBaghat Shah Siamoon Illyas Bashir	Agrochemicals	Saraswati Agrochemicals, Jammu	30 Days

Table-B.2.2.5b: Details of Industrial Training attended by Students for year 2018-2019

2015-2019 Batch				
Sl. No.	**Name of Student**	**Area of Training**	**Name of Industry**	**Duration**
1	Nikhil Sangwal Syed Faizan AsrarRahmat Naveed Ahsan Mir Shifayat Vishnu Zahid Akbar Aadil Hamid AnshulRasyotra Lalit Yadav Kunnal Gupta Dawood Rashid Midhat Yassin Syed Humayoun	Petroleum Industry	ONGC, Surat	30 Days
2	Deepak Pingal	Petroleum Industry	ONGC, Gujarat	25 Days
3	Maida Lateef	Cement Industry	Jammu & Kashmir	30 Days

	Amina SabbahGuljan Aaqib Ashraf		Cement Industry	
4	Shriyansh Rahul Kumar	Petroleum Industry	IOCL BarauniRefinery	28 Days
5	Abhishek Vishnu Kumar Ahmad Ali	Petroleum Industry	IOCL BarauniRefinery	29 Days
6	Anish Singh ShubhamMalav Amit Pratap PashupatModgil	Petroleum Industry (R&D)	ONGC, Ahmedabad	26 Days
7	HafeezHackla AamirSuhail LalitBasotra	Petroleum Industry	ONGC, Panvel	32 Days
8.	Pankaj Sonkar	Academic Institute	IIT, Kanpur	40 Days
9.	AmanKundal Nishant Sharma Abdul Muqsit Vineet Kumar ManikLamba	Fertilizer	National Fertilizer Limited, Punjab	30 Days
10.	Alok Kumar Vishnoi	Energy	BARC Mumbai	57 Days
11.	Pradyuman Singh	Uflex	Uflex	28 Days
12.	Dheeraj Sharma Rishi Pal Pankaj Kumar	Energy	ONGC, Dehradun	40 Days
13.	KapilVerma Gaurav Meena Ravi Kumar	Energy	ONGC, Jaipur.	42 Days
14.	Vishal Panhotra	Research	Jammu Uni	30 Days
15.	Tanisha Mahajan	Research	IIT Delhi	62 Days
16.	Vivek Raj Nikhil Kumar	Energy	BARC Mumbai	90 Days
17.	Hindal Mustafa Abdul Bari	Cement Industry	J&K Cement Industry	30 Days

	AaqibMushtaq			
18.	KeshavKalsi Shubham UpkarKesar	Petroleum Industry	ONGC, Mumbai	31 Days
19.	Abhishek Thapa	Paint Industry	Berger	32 Days
20.	RuqaiyahKhurs heed	Food and Beverages	Fil Industries	31 Days

Table B.2.2.5c: Details of Industrial Training attended by Students for year 2017-2018

E. Impact Analysis of Industrial Training

The purpose of the industrial internship gets the students acquainted with the work culture of the companies and realizes the importance of team work while working within the framework to get a better insight into the practical aspects of the industry. Post training assessment of the practical training is evaluated at the end of the 6th semester, by a committee constituted by the HOD. It carries 2 credits. The students give a PPT wherein they give a detailed report of the work done. The presentation is followed by an interaction session. The students maintain a hard copy of the work done and is maintained in department as record. The credits are awarded based on the presentation, interaction and the practical training record. Moreover, at the end of industrial training, the students are provided with the feedback forms to rate their industrial training/internship such as to identify the level of achievement. The feedback is obtained from the students at the end of 6th semester to assess the achievement of the objectives of the industrial training/ summer training/internship/ industrial tour.

Feedback form for student's undergone industrial training

Name of the student: **Enrolment No. :**

Name of the industry:

Area in which the student has undergone training:

Did the student get hands on experience on the facilities in the plant?

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

Did you become aware of any new technologies in relation to what they have learnt in the corresponding subject? Yes/No

Were you able to analyze the facilities layout of the plant and could you suggest any improvement? Yes/No

How do you rank the working culture an atmosphere in the plant?

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

Based on the information obtained from the feedback forms the rating is done as

Year:			
Feedback (%)	No. of Students	Feedback (%)	No. of Students
41-50		71-80	
51-60		81-90	
61-70		91-100	

F. Student's feedback on initiative

The feedback is obtained from the students at the end of 6th semester to assess the achievement of the objectives of the industrial training/ summer training/internship/ industrial tour.

Feedback Form to Assess the Industrial Training

Name of the student: **Enrolment No. :**

1. Rank the departmental initiative about the seriousness regarding industrial training etc.

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

2. Did the faculty help you in choosing the proper industry

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

3. Rank the exposure to the practical working environment

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

4. Did you become aware about the practical aspects in the industry

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

5. Did you notice some interesting facts and new technologies adopted in the industry

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

6. Would you suggest your juniors to undergo training there

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

7. Do you want to join this industry as a permanent employee

Excellent	☐	**Good**	☐	**Average**	☐	**Fair**	☐	**Poor**	☐

CRITERION 3	Course Outcomes and Program Outcomes	175
	Marks Claimed	**175**

3.1. Establish the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes (PSOs) (25)

Claimed 25

Program Outcomes (POs):

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs): As defined by the Program which is given below:

PSOs	Statement
PSO1	Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts
PSO3	Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.

3.1.1. Course Outcomes (COs)

The course outcomes for each course are mentioned in syllabi of program. Course outcome formed should meet the following guidelines:

- Follows Bloom's taxonomy.
- Reflects the whole syllabus prescribed by Institute for each course.
- Key topic of each unit is taken as one course outcome.
- No. of COs for each course should be a maximum of six.

Six core courses are mentioned below for demonstration with one course per semester. On successful completion of this course, students should be able to:

S.No.	Course Code	Course Name	Course outcomes	
1	ChBC-33	Process Fluid Mechanics	CO.1	Able to understand the fundamentals and basic principles of process fluid mechanics.
			CO.2	Able to formulate and solve the fluid flow problems with the application of conservation laws.
			CO.3	Able to examine energy losses and evaluate pressure drop in pipes.
			CO.4	Able to understand and analyze the functions and performances of various equipments and flow measuring devices.
2	ChBC-45	Mass Transfer -I	CO.1	Fundamental understanding of mass transfer operation.
			CO.2	Understanding of inter phase mass transfer and coefficients of mass transfer operation.

			CO.3	Analyze gas absorption and tower characteristics.
			CO.4	Understanding of absorption, humidification, drying and crystallization operation.
3	ChBC-52	Chemical Reaction Engineering.	CO.1	Understand the different types of reactions, their kinetics and their influence on chemical equilibrium.
			CO.2	Design of single, isothermal plug-flow, CSTR, and batch reactors for a single homogeneous reaction.
			CO.3	Analyze and size reactors while accounting for non-isothermal conditions and non-ideal flow patterns.
			CO.4	Design reactors for the homogenous and heterogeneous, and understand their effect on performance equations for reactors
4	ChBC-67	Transport Phenomena	CO.1	To Identify transport properties and analyze the mechanism of momentum, energy and mass transport.
			CO.2	To Apply conservation laws to formulate differential form of equations of change for mass, momentum and heat transfer problems.
			CO.3	To solve linear partial differential equations along with appropriate boundary conditions to get the velocity, temperature and concentration profiles of different engineering problems.
			CO.4	Recognize non Newtonian fluids and apply appropriate models to solve them
5	ChBC-73	Process Dynamics & Control	CO.1	To understand and model the dynamic behavior of chemical processes based on their time domain, Laplace domain.
			CO.2	Analyze the properties e.g. speed of response, frequency response of first order and second order systems
			CO.3	Analyze the different components of a control loop
			CO.4	Understand the operation of P, I, D and PID controllers and to tune them.
6	ChBC-82	Bioresource Technology	CO.1	Fundamental understanding of the bio-resources and its applications for the attainment of social objectives (energy, environment, product, sustainability)
			CO.2	Acquire knowledge with respect to the properties of the bio-resources and the conversion technologies
			CO.3	Exhibiting knowledge of the systems used for bioresources and bioresource technology
			CO.4	Understanding about analysis of data and their applications in design of the systems and development of the bioprocess

Table B. 3.1a. Course Outcomes of Core Subjects from each Semester

The program outcomes are achieved through curriculum that offers a number of mandatory courses as well as elective courses. Each course has defined course outcomes that are mapped to the program outcomes and progam specific outcomes and a set of performance criteria that are used to provide quantitative measurement of how well course outcomes are achieved.

The Course Outcomes are mapped to the Program Outcomes and Program Specific Outcomes with three levels of attainment, viz.

a. Strongly Related, having a weightage of 3

b. Moderately Related, having a weightage of 2
c. Related, having a weightage of 1

Table B.3.1b gives the mapping of Course Outcomes with the Program Outcomes and Program Specific Outcomes

Course Articulation Matrix:

Process Fluid Mechanics														
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-33.1	3	2	3	2	1							2	3	2	1
ChBC-33.2	3	3	3	2	1							2	3	2	1
ChBC-33.3	3	3	3	2	1							2	3	2	1
ChBC-33.4	3	3	3	2	1							2	3	2	1
	3	2.8	3	2	1							2	3	2	1
Mass Transfer -I															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-45.1	3	3	2	3	1	2	2				1	3	3	2	2
ChBC-45.2	3	3	2	3	2	3	2			1	1	2	3	2	2
ChBC-45.3	3	3	3	3	2	2	2				1	1	3	1	2
ChBC-45.4	3	3	3	3	2	2	1				1	1	3	1	2
	3	3	2.5	3	1.8	2.3	1.8			1	1	1.8	3	1.5	2
Chemical Reaction Engineering.															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-52.1	3	2	2	2	1				2			2	3	1	3
ChBC-52.2	3	3	3	3	3	2	2	2	2		2	2	3	2	3
ChBC-52.3	3	2	2	2	2	2	2	2				2	3	1	3
ChBC-52.4	3	3	3	3	3	2	2					3	3	1	3
	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
Transport Phenomena															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3

ChBC_61.1	3	3	3	3	2	1	2	2				2	3	3	3
ChBC_61.2	3	3	3	2	2	2	2	2				2	3	3	3
ChBC_61.3	3	3	3	2	1	2	2					2	3	3	3
ChBC_61.4	3	3	3	2	3	2	2					2	3	3	3
	3	3	3	2.2	2	1.7	2	2				2	3	3	3
Process Dynamics & Control															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-73.1	3	3	3	3	1			1				3	3	1	3
ChBC-73.2	3	3	3	3	2	2	2	1				2	3	1	3
ChBC-73.3	3	1	2	1	1							1	3	1	1
ChBC-73.4	3	3	3	3	3	2	2	1				2	3	1	3
	3	2.5	2.8	2.5	1.8	2	2	1				2	3	1	2.5
Bioresource Technology															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ChBC-82.1	3	3	3	3	2	3	3	3	1	1		1	3	3	3
ChBC-82.2	3	3	3	3	2	3	3	2		2		2	3	3	3
ChBC-82.3	3	3	3	2	2	3	3	2	1	2		2	3	3	3
ChBC-82.4	3	3	3	3	2	3	3	2	1	2		2	3	2	3
	3	3	3	2.8	2	3	3	2.3	1	1.8		1.8	3	2.8	3

Table B. 3.1b. Course Articulation Matrix of Core Subjects from each Semester

The Course Outcome statements of all the courses are given in Criteria 2 and Program Articulation Matrix is given in below Tables of B. 3.1c, B.3.1d and B.3.1e.

Table B.3.1c , Table B.3.1d and Table B.3.1e provide the details of various courses and their COs mapping with the Program Outcomes and Program Specific Outcomes for the Academic Years 2019-2020 , 2018-2019 and 2017-2018 respectively.

Program Articulation matrix for Academic Year 2019-2020

S. No	Course Code	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2	PSO 3
1	MEL100	Elements of Mechanical Engineering	3	2	3							2		3	3	2	3
2	PHL100	Engineering Physics	3	1	1		2	2	2	2	3	2		3	2	1	1
3	CIL100	Engineering Mechanics	3	3	1.8	1.8		2	1						2	1	1.8
4	HUL100	Basic English and Communication Skills						2			2.3	3	2	2.5			
5	CYL101	Environmental Studies	2.75	2.5	3		1.75	2.75	3			2	1.5	2.25	2.25	1.5	2
6	MAL-100	Mathematics-I	2.4	1.8	2.6								1		1.6	2.4	1.2
7	HUP100	Language Laboratory									3	3	3	2			
8	PHP100	Physics Laboratory	3	2.75	2.5	1.25	1.5							1.33	2	1	1
9	WSP100	Work shop Practice	3	1	1		2	2	2	2	3	2		3	2	1	1
10	HUL101	Advanced English CommSkills & Organizational Behavior						2.5			2.3	3	2	2			
11	EEL100	Basic Electrical Engineer	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
12	TL100	Computer Programming	2.8	2.3	2.5	3	1.8							2.5	3	1.5	1
13	CYL100	Engineering Chemistry	2	2	2.66	1		1.25	2	1	1	2	2	2.25	2.25	2.25	1.75
14	CIP100	Engineering Drawing	3	3	3	3	1.5	1.5	1.75	2			3	2	3	2	2
15	MAL101	Mathematics II	2.4	1.8	2.6								1		1.6	2.4	1.2
16	ELP100	Basic Electrical Engineer Laboratory	2.75	1.75	1.75	2.25	1.5	1.5					2	1.5	2	2	2.25
17	CYP100	Chemistry Laboratory	2	2	2	1		1.25	2	1	1	2	2	2.25	2.25	2.25	1.75
18	ITP100	Computer Programming Laboratory	1	3	2.75		3				1			1.5	1	2.5	1
19	ChBC 31	Introduction to Chemical Engineering	2	1.75	1.66		2	3	3	2			1	2	2.4	2.4	2.4
20	ChBC 32	Material and Energy Balance	3	3	3	3	3								3	3	3
21	ChBC 33	Process Fluid Mechanics	3	2.75	3	2	1							2	3	2	1
22	ChBC 34	Thermodynamics and Chemical Kinetics	3	2.25	1.75	2								2.5			
23	EEBC-31	Basic Electrical & Electronics Eng	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
24	HSBC-31	Ethics and Self Awareness			3			3	2.5	3	2	2.75	3	3			
25	MTBC-31	Chemical Eng. Mathematics-I	2.25	2.5	2.5	1.25	1.5							2.25	2.25	2.75	

26	ChBC-41	Chemical Engineering thermodynamics	2.5	2.25	1.75	2								2.5	2	2.25	1
27	ChBC-42	Heat Transfer	3	3	2.75	2.25		1.5	1.5					2	2	3	1
28	ChBC 43	Mechanical Operations	3	2.4	2.2	2.2		1.6	2					1.2	2.8	2.6	2.6
29	ChBC 44P	Fluid Mechanics and Mechanical Operations Laboratory	2	2	1	3									2	1	2
30	ChBC-45	Mass Transfer – I	3	3	2.5	3	1.75	2.25	1.75			1	1.25	2	3	1.5	2
31	ChBS-41	Seminar	3	3	2.33	2.33	3	1.75	2.33	3	1	3	1.25	2.25	1.75	1	2.25
32	EEBC-41P	Basic Electrical & Electronics Eng. Laboratory.	2.75	1.75	1.75	2.25	1.5	1.5					2	1.5	2	2	2.25
33	MTBC-41	CHEMICAL ENG.METHAMATICS-II	2	1.75	1.25	1.25						1.5		2	2	1	1.75
34	ChBC 51	Process Equipment Design – I	3	2.6	2.6	1.75	2.6	1.8	2		2	2	2.75	2	3	2.4	2.8
35	ChBC52	Chemical Reaction Engg	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
36	ChBC 53	Material Science and Technology	1.75	2	2.25	2.25	1.75	1	1.75	1			1	3	1.75	2	2.5
37	ChBC 54	Chemical Technology-I	1.5	1.5	1.75	1.5	1.5	1.25	2	1			1	3	1.25		1.33
38	ChBC-56P	Heat Transfer Lab	2.6	2.2	2.8	3		2	2.4					2	2.2	2.4	2
39	HHBC-51	Basic Management Principles		2.75	1.75	3		2.5	3	2.75	2.75	3	3	3	3	3	3
40	MTBC-51	Numerical Methods	2.25	2.5	2.5	1.25	1.5							2.25	2.25	2.75	
41	ChBC 61	Process Equipment Design – II	3	2.6	2.6	1.75	2.6	1.8	2		2	2	2.2	2	3	2.4	2.8
42	ChBC-62	Mass Transfer-II	3	3	3	3									3	3	3
43	ChBC 63	Chemical Technology II	1.33	1.25	1.33	1	1.25	2	1.50				1	3	1.25		1.33
44	ChBC 64	Energy Engineering	3	2.5	2.5	2.5	2.5	2	2	2	2		2	2.25	3	1.25	3
45	ChBC 65	Energy Engineering Laboratory	2.25	1.25	1.25	1	2	2	3		2		2	2	1.5	2	2
46	ChBC66	Process Instrumentation	3	2	1	2	2								3	2.25	2
47	ChBC 67	Transport Phenomena	3	3	3	2.25	2	1.75	2	2				2	3	3	3
48	ChBC65P	Thermodynamics and Reaction Engineering Laboratory	2.5	2	1.5	1.25	2	2	3	1.75	2	1.75	2	2	1.75	2	2
49	ChBC 69	Industrial Training & Presentations	2.75	2.75	2.25		2	1.33	2	1.3	2	2.66	2.5	2	2.25	2.25	2
50	ChBP-71	Pre-project work	2	1.5	1.25	1.5	2	1.5	1	1	2	1.75	1.75	2	2	2.75	2.25
51	ChBC 72	Chemical Process safety	3	3	2.66	2.75	2	2.25	3	3	2.25	2.25	2.5	2.66	2.75	2.25	1.75
52	ChBC 73	Process Dynamics and Control	3	2.5	2.75	2.5	1.75	2	2	1				2	3	1	2.5
53	ChBC 74P	Process Dynamics and Control Laboratory	2	1	1	1	2	3			2		2	2	2	2	3
54	ChBC 75	Process Economics & Plant Design	2	2.25	2	1.5								2	2.5	2.5	1.25

55	ChBC 76	Biochemical Engineering	2.75	2.75	2.75	2.75	2	3	3	2.5	1	2		2	3	3	3
56	ChBC 77P	Mass Transfer Laboratory	3	3	3	3	2				3	3	1	1	3	2	2
57	HSBE 71	Human Resource Development			3			3	2.33	3	1.66	2.66	3	3			
58	MTBE 72	Numerical Analysis	2.25	2.5	2.5	1.25	1.5							2.25	3	2.75	
59	ChBE 74	Computational Fluid Dynamics	3	3	3	3	2.5				1.5	1.25	1.25	1.25	3	2	2.25
60	ChBP 81	B. Tech Project	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
61	ChBC82	Bio Resource Technology	3	3	3	2.75	2	3	3	2.25	1	1.75		1.75	3	2.75	3
62	ChBC83P	Biochemical Engineering Laboratory	3	2.75	2.25	2	2.5	1.75	1.5	1.5	1	1.25	1.75	2	2.25	2.25	2.5
63	ChBC84	Modelling and Simulation in Chemical Engineering	3	3	3	3	2	2						2	3	3	3
64	ChBC85	Industrial Pollution Abatement	2.5	3	2.25	3	1.75	3	3						3	3	3
65	ChBE 84	Nano-Science and Technology	2.75	1.75	1.25	1.25									1.75	1.5	1
66	ChBE 82	Petroleum Refining	3	2.25	2.25	2	2	1.75	2	1.67	1.5	1	1	2	3	1.75	3
67	HSBE-82	Entrepreneurship Development			3			3	2.5	3	2	2.75	3	3	3		
68	ChBE-83	Clean Technology in Process Industries	2.5	2	2.33	1	1	1	1						2.5	1.25	2

Table B.3.1c. Program Articulation Matrix for 2019-2020

Program Articulation Matrix for 2018-2019:

S. No	Course Title	Course name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	CHM-101	Chemistry-I	2.8	2.3	1.5		2	1.3	1.8		1	1.8	2	2.3	2.3	2.5	1.8
2	PHY-101	Physics-I	3	3	2.75	1.25	1	1									
3	MTH -101	Mathematics-I	2.4	1.8	2.4								1		1.6	2	1.2
4	HSS 101	Communication Skills & Oral Presentation									2.3	2.5	2.25				
5	IT-101	Computer Fundamentals And Problem Solving Techniques	2.5	3	1		2							2	3	1.5	1
6	CIV- 102	Engineering Drawing	3	3	3	3	2	2	2		3	3	2	2			
7	CHM-101 P	Chemistry-I Laboratory	2.5	1.5	1.3	1	2.4	2	2.4		2		2	1.4	2.3	2.4	1.6
8	PHY-102 P	Physics-I Laboratory	2.75	2.65	2.5	1.2	1.45							1	2	1	1
9	IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.8	2.3	2.5	3	1.8				1			2.5	3	1.5	1
10	WSP-I	Workshop Practices- I	3	1	1		2	2	2	2	3	2		3	2	1	1
11	CHM-201	Chemistry-II	2.3	1.8	2							2		1.8	2	2.3	1.3
12	PHY-201	Physics-II	3	3	2.75	1.25	1										
13	MTH-201	Mathematics-II	2.4	1.8	2.4								1		1.6	2.4	1.2
14	HSS-201	Introduction To Social Sciences						1.7	1.3	1.3	2	2	1.5				
15	CSE-201	Computer Programming	2.8	2.3	2.5	3	1.8							2.5	3	1.5	1
16	CIV-201	Strength of Materials	3	3	1.8	1.8		2	1								
17	MED-201	Machine Drawing	2.5	1	2.5	1				1.3	1			1	2.8	1.8	0.8
18	CHM-201 P	Chemistry-II Laboratory	2.5	2	1.8			1.8	2			1.5	1.3	1.3	2.3	2.5	2
19	PHY-201 P	Physics-II Laboratory	2.72	2.75	2.52	1.25	1.35							1			
20	CSE-202 P	Computer Programming Laboratory	1	3	2.75		3								1	2.5	1
21	WSP-II	Workshop Practices-II	3	1	1		2	2	2	2	3	2		3	2	1	1
22	ChBC-31	Introduction to Chemical Eng.	2	1.8	1.7		2	3	3	2			1	2	2.4	2.4	2.4
23	ChBC-32	Material and Energy Balance	3	3	2.3	2.3	2.5	2	2	2	1		2	2.8	2.5	2	2
24	ChBC-33	Process Fluid Mechanics	3	2.8	3	2	1							2	3	2	1
25	ChBC-34	Thermodynamics and Chemical Kinetics	3	2.3	1.8	2								2.5	2	2.3	2

26	EEBC-31	Basic Electrical & Electronics Eng.	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
27	HSBC-31	Ethics and Self Awareness			3			3	2.5	3	2	2.75	3	3		3	
28	MTBC-31	Chemical Eng. Mathematics-I	2.3	2.5	2.5	1.3	1.5							2.3	3	2.8	
29	ChBC-41	Chemical Eng. Thermodynamics	2.5	2.3	1.8	2								2.5	2	2.3	1
30	ChBC-42	Heat Transfer	3	3	2.8	2.3		1.5	1.5					2	2	3	1
31	ChBC-43	Mechanical Operations	3	2.4	2.2	2.2		2	2.5					1.5	2.8	2.6	2.6
32	ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2	2	1	3									2	1	2
33	ChBC-45	Mass Transfer -I	3	3	2.5	3	1.8	2.3	1.8			1	1	1.8	3	1.5	2
34	ChBS-41	Seminar	3	3	2.5	2.5	3	1.8	2.5	3	1	3	1.3	2.5	2	1	3
35	EEBC-41P	Basic Electrical & Electronics Eng. Laboratory.	2.7	1.65	1.65	2.2	1.45	1.45					2	1.45	2	2	2.2
36	MTBC-41	Chemical Eng. Mathematics –II	2	1.8	1.3	1						1.5		2	2	1	1.8
37	ChBC-51	Process Equipment Design – I (mechanical aspects)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
38	ChBC-52	Chemical Reaction Eng.	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
39	ChBC-53	Material Science & Technology	1.8	2.0	2.3	2.0	1.8	1.0	1.8	1.0			1.0	3.0	1.8	2	2.5
40	ChBC-54	Chemical Technology – I	1.3	1.5	1.8	2.0	1.8	1.3	1.3	1.0	1.0	1.0	1.5	3.0	1.5	1.3	1.5
41	ChBC-55	Mass Transfer -I	3.0	3.0	2.5	3.0	1.8	2.3	1.8			1.0	1.3	2.0	3	1.5	2
42	ChBS-56P	Heat Transfer Laboratory.	2.6	2.2	2.8	3		2	2.4					2	2.2	2.4	2
43	HSBC-51	Basic Management Principles		2.8	2.3	3		2.5	3	2.8	2.8	3	3	3	3	3	3
44	ChBC-61	Process Equipment Design -II (Process Aspect)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
45	ChBC-62	Mass Transfer – II	2.8	3	2.8	1	1							1	3	2.6	2.8
46	ChBC-63	Chemical Technology – II	1.5	1.5	1.8	1.5	1.5	1.3	2	1			1	3	1.3		1.3
47	ChBC-64	Energy Eng.	3	2.5	2.7	2.7	2.5	2	2.8	3	2	2	2	2	2.7	2.5	2
48	ChBC-65P	Energy Eng. Laboratory.	2.3	1.3	1.3	1	2	2	3		2		2	2	1.5	2	2
49	ChBC-66	Process Instrumentation	3	2	1	2	2								3	2.3	2
50	ChBC-67	Transport Phenomena	3	3	3		1.7	1.8	2	2				2	3	3	3
51	ChBC-68P	Thermodynamics and Reaction Eng. Laboratory.	3	3	3	2.3	2	1.8	2	2				2	3	3	3
52	ChBC-69	Industrial Training & Presentations	2.8	2.8	2.3		2	1.3	2	1.3			3	2	2.3	2.3	2
53	ChBP-71	Pre-project work	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2

54	ChBC-72	Chemical Process Safety	3	3	2.7	2.8	2	2.3	3	3	2.3	2.3	2.5	2.7	2.8	2.3	1.8
55	ChBC-73	Process Dynamics & Control	3	2.5	2.75	2.5	1.75	2	2	1				2	3	1	2.5
56	ChBC-74P	Process Dynamics & Control Laboratory	2	1	1	1	2	3			2		2	2	2	2	3
57	ChBC-75	Process Economics & Plant Design	2	2.3	2	1.5								2	2.5	2.5	1.3
58	ChBC-76	Biochemical Eng.	2.8	2.8	2.8	2.8	2	3	3	2.5	1	2		2	3	3	3
59	ChBC-77P	Mass Transfer Laboratory	3	3	3	3	2				3	3	1	1	3	2	2
60	HSBE-71	Human Resource Development			3			3	2.5	3	2	2.75	3	3	3		
61	MTBE-71	Operation Research	2	2.5	1.25	2.5						1.75		2.25	2	1.75	1.75
62	HSBE-72	Managerial Economics for Engineers			3			2.8	2.5	1.8	3	3	3	3	3		
63	ChBE-74	Computational Fluid Dynamics	3	3	3	3	2.5				1.5	1.3	1.3	1.3	3	2	2.3
64	ChBP-81	Project	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
65	ChBC-82	Bioresource Technology	3	3	3	2.75	2	3	3	2.25	1	1.75		1.75	3	2.75	3
66	ChBC-83P	Biochemical Eng. Laboratory.	3	2.8	2.3	2	2.5	1.8	1.5	1.3	1	1.3	1.7	2	2	2.25	2.5
67	ChBC-84	Modeling and Simulation in Chemical Eng.	3	3	3	3	2	2						2	3	3	3
68	ChBC-85	Industrial Pollution Abatement	2.5	3	2.3	3	1.8	3	3						3	3	3
69	ChBE 82	Petroleum Refining	3	2.3	2.3		1.7	1.8	2	1.7			1	2	3	1.8	3
70	ChBE 81	Process Heat Integration	3	3	2.8	2.5	1.5	2	2					2	3	2	1
71	HSBE-82	Entrepreneurship Development			3			3	2.5	3	2	2.8	3	3	3		
72	ChBE 82	Fuel Cell Technology	3	2	2.3	2	1.5	2	1.8	1				2	2.75	1.25	2.25

Table B.3.1d. Program Articulation Matrix for 2018-2019

Program Articulation Matrix for 2017-2018:

S.No.	Course Title	Course name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O 1	PS O 2	PSO 3
1	CHM-101	Chemistry-I	2.8	2.3	1.5		2	1.3	1.8		1	1.8	2	2.3	2.3	2.5	1.8
2	PHY-101	Physics-I	3	3	2.75	1.25	1	1									
3	MTH -101	Mathematics-I	2.4	1.8	2.4								1		1.6	2	1.2
4	HSS 101	Communication Skills & Oral Presentation									2.3	2.5	2.25				
5	IT-101	Computer Fundamentals And Problem Solving Techniques	2.5	3	1		2							2	3	1.5	1
6	CIV- 102	Engineering Drawing	3	3	3	3	2	2	2		3	3	2	2			
7	CHM-101 P	Chemistry-I Laboratory	2.5	1.5	1.3	1	2.4	2	2.4		2		2	1.4	2.3	2.4	1.6
8	PHY-102 P	Physics-I Laboratory	2.75	2.65	2.5	1.2	1.45							1	2	1	1
9	IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.8	2.3	2.5	3	1.8				1			2.5	3	1.5	1
10	WSP-I	Workshop Practices- I	3	1	1		2	2	2	2	3	2		3	2	1	1
11	CHM-201	Chemistry-II	2.3	1.8	2							2		1.8	2	2.3	1.3
12	PHY-201	Physics-II	3	3	2.75	1.25	1										
13	MTH-201	Mathematics-II	2.4	1.8	2.4								1		1.6	2.4	1.2
14	HSS-201	Introduction To Social Sciences						1.7	1.3	1.3	2	2	1.5				
15	CSE-201	Computer Programming	2.8	2.3	2.5	3	1.8							2.5	3	1.5	1
16	CIV-201	Strength of Materials	3	3	1.8	1.8		2	1								
17	MED-201	Machine Drawing	2.5	1	2.5	1				1.3	1			1	2.8	1.8	0.8
18	CHM-201 P	Chemistry-II Laboratory	2.5	2	1.8			1.8	2			1.5	1.3	1.3	2.3	2.5	2
19	PHY-201 P	Physics-II Laboratory	2.72	2.75	2.52	1.25	1.35							1			
20	CSE-202 P	Computer Programming Laboratory	1	3	2.75		3								1	2.5	1
21	WSP-II	Workshop Practices-II	3	1	1		2	2	2	2	3	2		3	2	1	1
22	ChBC-31	Introduction to Chemical Eng.	2	1.8	1.7		2	3	3	2			1	2	2.4	2.4	2.4
23	ChBC-32	Material and Energy Balance	3	3	2.3	2.3	2.5	2	2	2	1		2	2.8	2.5	2	2

24	ChBC-33	Process Fluid Mechanics	3	2.8	3	2	1							2	3	2	1
25	ChBC-34	Thermodynamics and Chemical Kinetics	3	2.3	1.8	2								2.5	2	2.3	2
26	EEBC-31	Basic Electrical Eng.	2.8	1.8	1.6	2.4	1.8	1.4					2.2	1.4	2	2	2.2
27	EEBC-312P	Basic Electrical Eng. Laboratory	2.7	1.65	1.65	2.2	1.45	1.45					2	1.45	2	2	2.2
28	MTBC-31	Chemical Eng. Mathematics-I	2.3	2.5	2.5	1.3	1.5							2.3	3	2.8	
29	ChBC-41	Chemical Eng. Thermodynamics	2.5	2.3	1.8	2								2.5	2	2.3	1
30	ChBC-42	Heat Transfer	3	3	2.8	2.3		1.5	1.5					2	2	3	1
31	EEBC-41P	Basic Electronics Eng.	2.75	2.25	2.75	2	1	1	1					1.25	2.5	2	1.75
32	EEBC-41P	Basic Electronics Eng. Laboratory.	2.75	2.25	2.75	2	1	1	1					1.25	2.5	2	1.75
33	ChBC-43	Mechanical Operations	3	2.4	2.2	2.2		2	2.5					1.5	2.8	2.6	2.6
34	ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2	2	1	3									2	1	2
35	ChBS-41	Seminar	3	3	2.5	2.5	3	1.8	2.5	3	1	3	1.3	2.5	2	1	3
36	HSBC-41	Ethics and Self Awareness			3			3	2.5	3	2	2.75	3	3		3	
37	MTBC-41	Chemical Eng. Mathematics –II	2	1.8	1.3	1						1.5		2	2	1	1.8
38	ChBC-51	Process Equipment Design – I (mechanical aspects)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
39	ChBC-52	Chemical Reaction Eng.	3	2.5	2.5	2.5	2.3	2	2	2	2		2	2.3	3	1.3	3
40	ChBC-53	Material Science & Technology	1.8	2	2.3	2	1.8	1	1.8	1			1	3	1.8	2	2.5
41	ChBC-54	Chemical Technology – I	1.3	1.5	1.8	2	1.8	1.3	1.3	1	1	1	1.5	3	1.5	1.3	1.5
42	ChBC-55	Mass Transfer -I	3	3	2.5	3	1.8	2.3	1.8			1	1.3	2	3	1.5	2
43	ChBS-56P	Heat Transfer Laboratory.	2.6	2.2	2.8	3		2	2.4					2	2.2	2.4	2
44	HSBC-51	Basic Management Principles		2.8	2.3	3		2.5	3	2.8	2.8	3	3	3	3	3	3
45	ChBC-61	Process Equipment Design -II (Process Aspect)	3	2.6	2.6	1.8	2.6	1.8	2		2	2	2.8	2	3	2.4	2.8
46	ChBC-62	Mass Transfer – II	2.8	3	2.8	1	1							1	3	2.6	2.8
47	ChBC-63	Chemical Technology – II	1.5	1.5	1.8	1.5	1.5	1.3	2	1			1	3	1.3		1.3
48	ChBC-64	Energy Eng.	3	2.5	2.7	2.7	2.5	2	2.8	3	2	2	2	2	2.7	2.5	2
49	ChBC-65P	Energy Eng. Laboratory.	2.3	1.3	1.3	1	2	2	3		2		2	2	1.5	2	2

50	ChBC-66	Process Instrumentation	3	2	1	2	2							3	2.3	2
51	ChBC-67	Transport Phenomena	3	3	3		1.7	1.8	2	2				2	3	3	3
52	ChBC-68P	Thermodynamics and Reaction Eng. Laboratory.	3	3	3	2.3	2	1.8	2	2				2	3	3	3
53	ChBC-69	Industrial Training & Presentations	2.8	2.8	2.3		2	1.3	2	1.3			3	2	2.3	2.3	2
54	ChBP-71	Pre-project work	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
55	ChBC-72	Chemical Process Safety	3	3	2.7	2.8	2	2.3	3	3	2.3	2.3	2.5	2.7	2.8	2.3	1.8
56	ChBC-73	Process Dynamics & Control	3	2.5	2.75	2.5	1.75	2	2	1				2	3	1	2.5
57	ChBC-74P	Process Dynamics & Control Laboratory	2	1	1	1	2	3			2		2	2	2	2	3
58	ChBC-75	Process Economics & Plant Design	2	2.3	2	1.5								2	2.5	2.5	1.3
59	ChBC-76	Biochemical Eng.	2.8	2.8	2.8	2.8	2	3	3	2.5	1	2		2	3	3	3
60	ChBC-77P	Mass Transfer Laboratory	3	3	3	3	2				3	3	1	1	3	2	2
61	MTBE-71	Operation Research	2	2.5	1.25	2.5						1.75		2.25	2	1.75	1.75
62	HSBE-72	Managerial Economics for Engineers			3			2.8	2.5	1.8	3	3	3	3	3		
63	ChBP-81	Project	2	1	1	1	2	3	1	1	2	3	3	2	2	2.75	2
64	ChBC-82	Bioresource Technology	3	3	3	2.75	2	3	3	2.25	1	1.75		1.75	3	2.75	3
65	ChBC-83P	Biochemical Eng. Laboratory.	3	2.8	2.3	2	2.5	1.8	1.5	1.3	1	1.3	1.7	2	2	2.25	2.5
66	ChBC-84	Modeling and Simulation in Chemical Eng.	3	3	3	3	2	2						2	3	3	3
67	ChBC-85	Industrial Pollution Abatement	2.5	3	2.3	3	1.8	3	3						3	3	3
68	ChBE 82	Petroleum Refining	3	2.3	2.3		1.7	1.8	2	1.7			1	2	3	1.8	3
69	HSBE-82	Entrepreneurship Development			3			3	2.5	3	2	2.8	3	3	3		

Table B.3.1e.Program Articulation Matrix for 2017-2018

3.2. Attainment of Course Outcomes (75)

Claimed 75

3.2.1. Describe the assessment tools and processes used to gather the data upon which the evaluation of Course Outcome is based (10)

Claimed 10

Assessment of course outcomes is a systematic and ongoing method of collecting, analyzing and using information about a course from various sources and measuring course outcomes in order to improve student learning. For assessing the course outcomes (CO), both direct and indirect assessments methods are considered.

Direct assessment consists of midterm examination/major examination/assignments. Marks obtained by students in these examinations are used to assess the CO attainment. For Indirect assessment, course outcome surveys are carried out at the end of a course and the results are analyzed. In these surveys, responses are recorded on a 3-point scale, to get the self-assessment of students with respect to COs attainment. The record for all the internal assessments is maintained by the faculty and the department.

1. CO Assessment Rubrics

COs are evaluated based on the performance of students in a mid-term examination, one major examination and continuous assessment (in the form of assignments and quizzes). The contributions are 30%, 60% and 10% for the mid-term exam, major exam and continuous assessment, respectively.
However, the lockdowns due to abrogation of Article 370 and subsequent COVID-19, the regular pattern of examination couldn't possible and alternative evaluation schemes were adopted. For Autumn 2019, the contributions are 90% and 10% for major exam and continuous assessment respectively. In Spring 2020 the classes were held online and the evaluation was based on Mid Term (30%) as assignments and Major (40%) as Comprehensive Viva-Voce Examination (CVVE), the remaining 30% was based on the Maximum Semester Grade Point Average (SGPA) up to previous semesters. Whereas for the assessment of CO attainment purpose, the Assignments was given weightage of 40% and CVVE has been given 60% weightage.

Assessment of Course Outcomes (Upto Spring 2019)

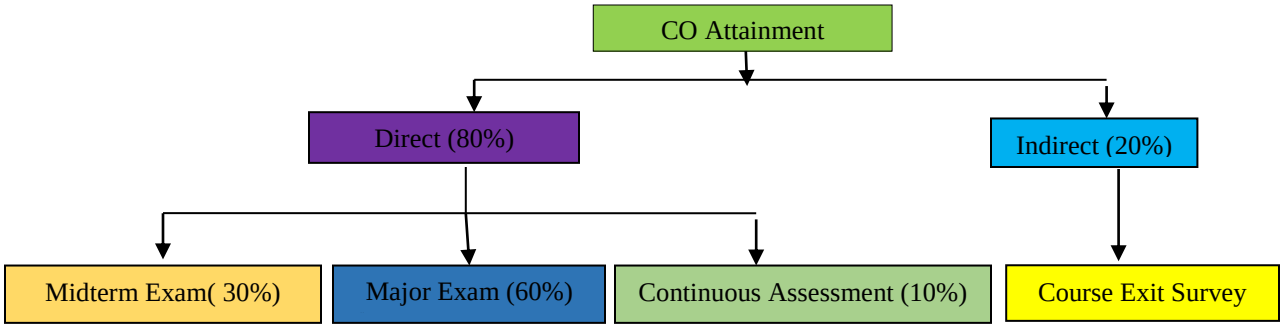


Figure B. 3.2.1a

Assessment of Course Outcomes (Autumn 2019)

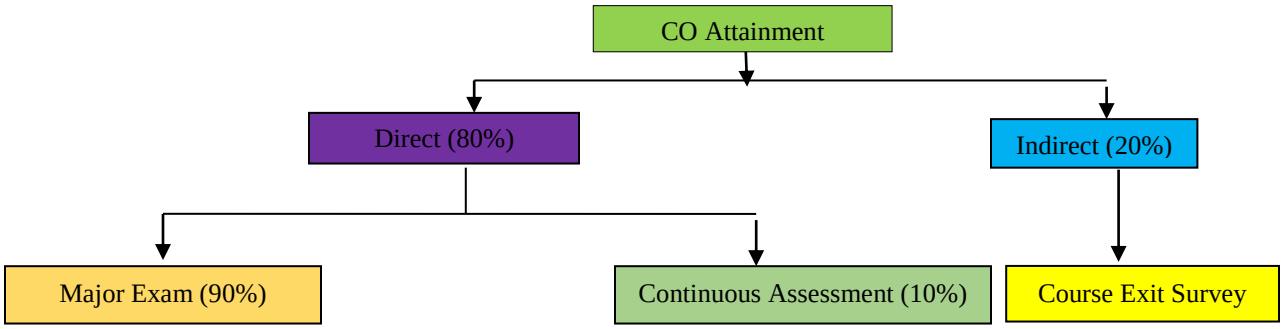


Figure B. 3.2.1b

Assessment of Course Outcomes (Spring 2020)

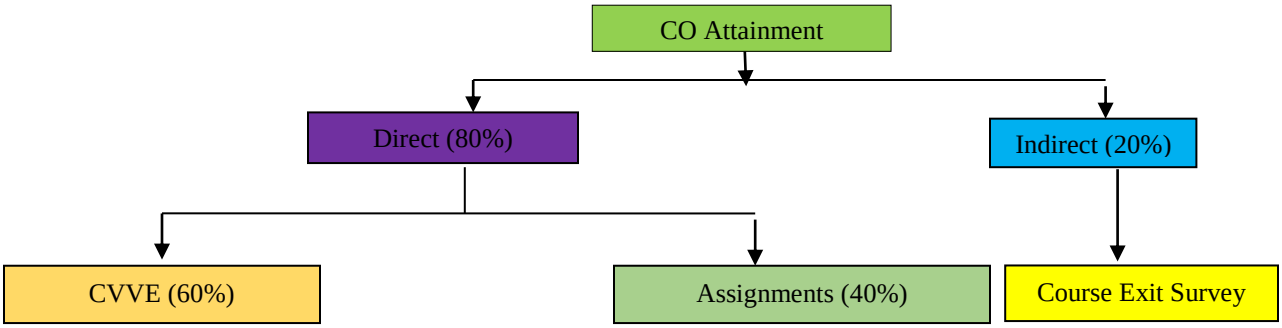


Figure B. 3.2.1c

The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed below Table B.3.2.1a.

		Assessment Method	Assessment Tool	Frequency per Semester
Theory		Direct Method (80% weightage)	Midterm Exams (30% Weightage)	1
			Assignment (10% Weightage)	1
			End Sem. Exam (60% Weightage)	once
		Indirect Method (20% weightage)	Feed back	once
Laboratory		Direct Method (80% weightage)	Continuous Assessment (Report, Experiments) (40% weightage)	After Each Experiment
			End Semester Exam (60% weightage)	once
		Indirect Method (20% weightage)	Feed back	once
Seminar		Direct method (80% weightage)	Presentation	Twice/Course
			Report	Once/course
			Viva-voce	Once/course
		Indirect Method (20% Weightage)	Feed back	once
Project	**7th Semester**	Direct method (80% weightage)	Mid-Term Evaluation	Once/course
			End- Term Evaluation	Once/course
		Indirect Method (20% Weightage)	Feed back	
	8th Semester	Direct method (80% weightage)	Mid-Term Evaluation	Once/course
			End- Term Evaluation (Demonstration and evaluation by External Examiner)	Once/course
		Indirect Method (10% Weightage)	Feed back	Once/course

Table B.3.2.1a

2. Quality / Relevance of Assessment Process

THEORY

- **Mid-Term Test:** One Mid-Term test serves to encourage students to keep up with subject matter covered in class. This test is of 1.5-hour duration and is evaluated for 30 marks. The questions are framed in such a way that they satisfy Bloom's taxonomy, wherein each question is mapped to the appropriate course outcome of the respective course, which is evaluated based on the set attainment levels.
- **Major Test:** Major test is held once in every semester to evaluate the students' performance. The exam is of 3 hours duration and is evaluated for 60 marks. The questions are framed in such a way that they satisfy blooms taxonomy, wherein each question is mapped to the appropriate course outcome.
- **Continuous Assessment:** Continuous assessment in the form of assignments, oral quizzes, MCQ quizzes are the qualitative performance assessment tools designed to assess students' knowledge of engineering practices, framework and problem solving. Students are assigned course-related work, and their submissions are graded based on work quality and originality. Continuous assessment is evaluated for 10 marks. The questions in the assignment are mapped to the Course Outcomes of the subject.

LABORATORY

Lab courses provide students with first-hand experience with course concepts and the opportunity to explore experimental methods used in their discipline.

- **Continuous Assessment:** All the students are expected to be regular and learn the practical aspects of the subject and develop the necessary skills to become professionals. In order to facilitate interaction among the students and to develop team spirit, the students are expected to carry out experiments in groups. Performance assessment is based on the ability of the student to actively participate in the successful conduct of prescribed practical work and draw appropriate conclusions. The student submits a record of practical work performed in each class. Continuous assessment constitutes 40% of the total marks of a lab course.
- **Major Lab Exam:** A major lab exam of 3 hours duration is conducted to assess the ability of a student to perform a given task by integrating the knowledge gained from related theory course and regular lab sessions. The exam includes viva voce and performing a given experiment. The weightage for the major lab exam is 60% of the total marks of a lab course.

SEMINAR

Seminar is a part of fourth semester curriculum. The student makes two seminar presentations (preliminary and a final) on a topic of his/her choice and approved by the assigned faculty. Seminar presentation is planned for the duration of 30 minutes including a question-answer session of 5 to 10 minutes. Seminar is evaluated based on the presentation by the students before an evaluation committee consisting of three faculty members including Head of the Department. The committee evaluates seminar based on following parameters.

- **Relevance:** The seminar power point presentation is oriented at covering the fundamentals as well as advanced topics in the appropriate branch of engineering, with reference to latest international journal papers. The significance of the seminar topic and the credibility of references cited are used as parameters to assess the relevance of the seminar.
- **Presentation:** The quality of the presentation and communication skill is assessed by the evaluation committee.
- **Viva-voce:** At the end of the presentation, the assessment panel and the student audience ask questions and seek clarifications on specific issues related to the seminar. The effectiveness of the student's response to these queries is assessed.
- **Report and Documentation:** A bona fide report on the seminar topic is submitted at the end of the semester. This report includes, in addition to the presentation materials, all relevant supplementary materials along with detailed answers to all the questions asked/clarifications sought during presentation. All references are to be given toward the end of the report. Students' ability to comprehend and write effective reports and design documentation is assessed by evaluating the report.

PROJECT

The Project is intended to be a challenge to the intellectual and innovative abilities and to give students the opportunity to synthesize and apply the knowledge and analytical skills learnt in different subjects. The project work must be started in the seventh semester and is to be continued in the eighth semester.

i. Project – 7th Semester:

Students are expected to finalize the project themes/titles with the assistance of an identified faculty member as project guide during first half of the seventh semester. During this the students are required to submit a project plan, relevance of the project proposed, literature survey, objectives, statement of how the objectives are to be tackled, time schedule and cost estimate.

Assessment tools used to evaluate project work are:

- **Mid-term Evaluation:** Mid-term evaluation is conducted at the mid of the semester and a project panel evaluates the work based on various parameters. The significance of the work in societal and environmental context is used to assess the relevance of the project. The knowledge level and presentation skills are evaluated by the panel based on their performance.
- **End term Evaluation:** End-term evaluation is conducted at the end of the semester in the form of the presentation. The evaluation panel asks questions and seeks clarifications on specific issues related to the project. The effectiveness of the individual student's response to these queries is assessed.

ii. Project –8th SEMESTER

- **Mid-term Evaluation:** The design part of the proposed work is evaluated. The students' communication skills and depth of knowledge in designing is assessed based on presentation and response to questions asked by the panel comprising of guide, Head of the Department and the project coordinator. The percentage of work completed, difficulties faced and how the students have tackled these difficulties are analyzed to evaluate project

progress. The individual involvement in project work is assessed based on response to questions asked by the panel.

- **End-Term Evaluation:** The end term evaluation includes demonstration and evaluation by the panel of examiners consisting of guide, senior professor, Head of the Department and external examiner.
- **Demonstration:** Final demonstration is conducted at the end of the semester to evaluate the comprehensiveness and excellence of work done. At the end of the demonstration, the assessment panel asks questions and seeks clarifications on specific issues related to various stages of the project. Responses from each student to these queries are assessed.
- **Evaluation by the panel:** The performance of individual student is evaluated by the panel of examiners, along with the project report submitted by a project group. The panel of examiners analyses the nature of the project and apart from the technical merit of the work, makes sure that the work is environment friendly, cost effective, ensures safety and ensures adherence to best ethical practices. The projects are classified into different areas and their relevance to PO's and PSO's are identified to ensure its quality. Viva Voce is a part of assessing students' knowledge in engineering practices involved in project work.

3.2.2. Record the attainment of Course Outcomes of all courses with respect to set attainment levels (65)

Claimed 65

3.2.2.1 Record the attainment of Course Outcomes of all courses with respect to set attainment levels.

Program shall have set Course Outcome attainment levels for all courses.

1) Course Outcome attainment levels (up to Spring semester 2018)

Assessment Method	Level	Attainment Levels
Midterm Exam	1	**50%** of students scoring more than **40%** marks
	2	**60%** of students scoring more than **40%** marks
	3	**75%** of students scoring more than **40%** marks
End Semester Exam	1	**50%** of students scoring more than **40%** marks
	2	**60%** of students scoring more than **40%** marks
	3	**75%** of students scoring more than **40%** marks
Continuous Assessment	1	**50%** of students scoring more than **50%**

		marks
	2	**60%** of students scoring more than **50%** marks
	3	**75%** of students scoring more than **50%** marks

Table B.3.2.2a

2) Course Outcome attainment levels (Autumn semester 2018 onwards)

Assessment Method	Level	Attainment Levels
Midterm Exam	1	**50%** of students scoring more than **50%** marks
	2	**60%** of students scoring more than **50%** marks
	3	**70%** of students scoring more than **50%** marks
End Semester Exam	1	**50%** of students scoring more than **50%** marks
	2	**60%** of students scoring more than **50%** marks
	3	**70%** of students scoring more than **50%** marks
Continuous Assessment	1	**50%** of students scoring more than **50%** marks
	2	**60%** of students scoring more than **50%** marks
	3	**70%** of students scoring more than **50%** marks

Table B.3.2.2b

1) Lab Course Outcome attainment levels

Assessment Method	Level	Attainment Levels
End Semester Exam	1	**60%** of students scoring more than **50%** marks
	2	**70%** of students scoring more than **50%** marks

	3	**80%** of students scoring more than **50%** marks
Continuous Assessment	1	**60%** of students scoring more than **50%** marks
	2	**70%** of students scoring more than **50%** marks
	3	**80%** of students scoring more than **50%** marks

Table B.3.2.2c

2) Evaluation of Assessment tools based on the set attainment levels.

The process to evaluate each of the above components is described step by step:

A. Measuring Course Outcome attained through Semester End Examination (SEE) (weightage 60%)

This part shall be calculated using the marks obtained by students in the end semester examination. The end term examination consists of 5 questions covering all the COs, out of which only 4 questions need to be attempted by the students. The assessment shall be given in terms of marks obtained by the student in each CO.

The method used is as follows:

Step1: Check the answer sheets of all students and enter their marks in the excel format with each sub part of every question in separate column. Ex: 1 a, 1 b, 1 c etc. should all have a separate column.

Step2: For a CO, identify the questions belonging to it as mentioned against each question in the question paper.

Step3: CO attainment percentage is calculated by counting the number of students who attempted a CO and scored above or equal to benchmark set (50% for Autumn 2018 onwards/ 40%, up to Spring 2018) and dividing by total no. of students taking the course, for each CO.

Step4: For each CO, Attainment level is assigned according to the method explained in Section 3.2.2.

B. Measuring Course Outcome attained through Cumulative Internal Examination (CIE)

i. Measuring Course Outcome attained through Midterm Exams (Weightage -30%).

The method used is as follows:

Step1: Check the answer sheets of all students and enter their marks in the excel format with each sub part of every question in separate column. Ex: 1 a, 1 b, 1 c etc. should all have a separate column.

Step2: For a CO, identify the questions belonging to it as mentioned against each question in the question paper.

Step3: Calculate the CO attainment percentage for each student by counting the number of students scoring above or equal to benchmark set (50% for Autumn 2018 onwards/ 40%, up to Spring 2017) and dividing by total no. of students taking the course, for each CO.

Step4: For each CO, Attainment level is assigned according to the method explained in Section 3.2.2.

ii. Measuring CO Attainment through Assignments (Weightage-10%)

The assignment given includes all COs of the course. The assessment shall be given in terms of marks obtained by the student in each CO. The method used is as follows:

Step1: Check the assignment of all students and enter their marks in the excel format with each sub part of every question in separate column. Ex: 1 a, 1 b, 1 c etc. should all have a separate column.

Step2: For a CO, identify the questions belonging to it as mentioned against each question in the assignment.

Step3: Calculate the CO attainment percentage for each student by counting the number of students scoring above or equal to benchmark set (50%) and dividing by total no. of students taking the course, for each CO.

Step4: For each CO, Attainment level is assigned according to the method explained in Section 3.2.2.

3) Course Outcome Attainment Calculation of a Course

Chemical Reaction Engineering (ChBC-52) **SESSION: Autumn-2018**

CO-PO/PSO MAPPING MATRIX

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	2	2	1				2			2	3	1	3
2	3	3	3	3	3	2	2	2	2		2	2	3	2	3
3	3	2	2	2	2	2	2	2				2	3	1	3
4	3	3	3	3	3	2	2					3	3	1	3
Average	3.0	2.5	2.5	2.5	2.3	2.0	2.0	2.0	2.0		2.0	2.3	3.0	1.3	3.0

Table B.3.2.2d

Direct assessment for course outcome (End semester examination + Mid Semester examination + Assignment)

Calculating the attainment level of Course Outcome (Direct Assessment) by considering the weight age of 60% for End Semester, weight age of 30% for Mid Semester Examinations and

weight age of 10% for Assignments

Direct CO Attainment= 60% (End Semester) + 30% (Mid Semester) + 10% (Assignment)

S. No.	Course Outcome	Major CO Attainment	Minor CO Attainment	Assignment CO Attainment	Direct CO Attainment
1	**CO1**	**1**	**2**		**1.2**
2	**CO2**	**2.5**	**1**		**1.8**
3	**CO3**	**3**		**3**	**2.1**
4	**CO4**	**2**		**3**	**1.5**

Table B.3.2.2e

Indirect assessment for course outcome

Course Exit Survey

- If maximum number of students are saying that CO is Weakly attained ----Level-1
- If maximum number of students are saying that CO is Moderately attained ----Level-2
- If maximum number of students are saying that CO is **Strongly** attained ----Level-3

Given below is result of attainment of CO's for **Chemical Reaction Engineering** based on course exit survey

Course Outcome	CO attainment
CO1	2.8
CO2	2.5
CO3	2.8
CO4	2.7

Table B.3.2.2f

CO ATTAINMENT CALCULATION(Direct Assessment + Indirect Assessment)

Calculating the attainment level of **Overall Course Outcome** (Direct Assessment + Indirect Assessment) by considering the weight age of 80% for direct assessment and weight age of 20% for indirect Assessment.

Overall Course Outcome= 80% Direct + 20% Indirect

S. No	Course Outcome	CO attainment (Direct Assessment)	CO attainment (Indirect Assessment)	Overall CO attainment = 80% Direct + 20% Indirect
1	CO1	1.2	2.8	1.5
2	CO2	1.8	2.5	1.9
3	CO3	2.1	2.8	2.2
4	CO4	1.5	2.7	1.7

Table B.3.2.2g

Attainment of Course Outcomes for all Academic Years

CO Attainment for the Academic year 2019-2020

Course Code	Course	CO1	CO2	CO3	CO4	CO5
MEL100	Elements of Mechanical Engineering	3	2.52	2.04	3	
PHL100	Engineering Physics	3	3	3	3	3
CIL100	Engineering Mechanics	1.16	1.36	1.16	1.16	1.36
HUL100	Basic English and Communication Skills	2.64	2.67	2.8	2.6	
CYL101	Environmental Studies	2.91	2.89	2.9	2.91	
MAL100	Mathematics I	1.56	1.92	1.56	1.56	1.56
HUP100	Language Laboratory	1.92	1.95	1.44	1.46	
PHP100	Physics Laboratory	3	3	3	3	
WSP100	Work shop Practice	3	3	3	3	3
HUL101	Advanced English Comm.Skills & Organizational Behavior	2.9	2.91	2.8	1.94	
EEL100	Basic Electrical Engineer	1.61	2.72	2.22	1.57	2.7
TL100	Computer Programming	2.1	2.2	2.1	2.2	
CYL100	Engineering Chemistry	3	3	3	3	3
CIP100	Engineering Drawing	2.96	2.96	2.72	2.9	
MAL101	Mathematics II	3	3	3	3	3
ELP100	Basic Electrical Engineer Lab	2.36	1.57	2.2	2.38	
CYP100	Chemistry Laboratory	3	2.8	3	2.8	
ITP100	Computer Programming Lab	2.4	2.2	2.3	2.2	
ChBC-31	Introduction to Chemical Eng.	3	3	2	3	2
ChBC-32	Material and Energy Balance	1.51	1.52	0.79	0.76	
ChBC-33	Process Fluid Mechanics	2.45	1.48	1.48	1.48	
ChBC-34	Thermodynamics and Chem. Kinetics	2	1.57	1.47	1.56	
EEBC-31	Basic Electrical & Electronics Eng.	2.17	2.07	2.16	2.16	2.07
HSBC-31	Ethics and Self Awareness	1.27	2.11	1.27	1.29	
MTBC-31	Chemical Eng. Mathematics-I	2.08	2.08	2.08	2.08	
ChBC-41	Chemical Eng. Thermodynamics	2.32	1.5	1.8	1.2	
ChBC-42	Heat Transfer	2.93	2.4	2.9	2.87	
ChBC-43	Mechanical Operations	2.83	2.83	2.34	0.89	1.84
ChBC-44P	Fluid Mechanics & Mech. Operations Laboratory	2.96	2.95	2.96	2.96	
ChBC-45	Mass Transfer -I	1.44	1.59	1.44	1.44	
ChBS-41	Seminar	2.86	2.83	2.89	2.66	
EEBC-41P	Basic Elect. & Electronics Eng. Lab.	2.37	2.57	1.96	2.1	
MTBC-41	Chemical Eng. Mathematics –II	3	3	3	3	

ChBC-51	Process Equipment Design – I (Mechanical Aspects)	2.8	2.9	2.86	2.72	0.52
ChBC-52	Chemical Reaction Eng.	2.86	2.19	2.2	1.82	
ChBC-53	Material Science & Technology	2.62	2.35	2.21	0.52	
ChBC-54	Chemical Technology – I	2.86	2.11	2.93	2.68	
ChBS-55P	Heat Transfer Lab.	2.88	2.71	2.84	2.77	2.77
HSBC-51	Basic Management Principles	1.27	1.3	1.31	2.07	
MTBC-51	Numerical Methods	2	2.8	2.8	3	
ChBC-61	Process Equipment Design -II (Process Aspect)	0.9	2.6	1.6	2	2.3
ChBC-62	Mass Transfer – II	2.94	2.95	2.93	2.93	
ChBC-63	Chemical Technology – II	2.38	1.472	1.73	0.52	
ChBC-64	Energy Eng.	2.94	2.95	2.93	2.93	
ChBC-65P	Energy Eng. Labortory.	2.45	2.3	2.5	2.2	
ChBC-66	Process Instrumentation	2.92	2.97	2.43	2.22	
ChBC-67	Transport Phenomena	2	2.95	1.5	0.75	
ChBC-68P	Thermodynamics and Rxn Eng. Laboratory.	2.8	2.7	2.5	2.7	
ChBC-69	Industrial Training & Presentations	2.93	2.91	2.91	2.85	
ChBP-71	Pre-project work	2.4	2.5	2.7	2.5	
ChBC-72	Chemical Process Safety	2.79	2.79	2.59	2.64	
ChBC-73	Process Dynamics & Control	1.9	1.55	2.2	1.4	
ChBC-74P	Process Dynamics & Control Laboratory	2.9	2.41	2.45	2.82	
ChBC-75	Process Economics & Plant Design	2.53	1.71	1.75	1.2	
ChBC-76	Biochemical Eng.	2.89	2.86	2.94	2.94	
ChBC-77P	Mass Transfer Laboratory.	2.81	2.78	2.73	2.84	
HSBE-71	Human Resource Development	2.88	2.1	2.9	1.3	
MTBE-72	Elective – II Numerical Analysis	3	3	3	3	
ChBE-74	Computational Fluid Dynamics	1.43	1.59	1.7	1.59	
ChBP-81	Project	2.6	2.7	2.5	2	
ChBC-82	Bioresource Technology	2.86	2.91	2.91	2.95	
ChBC-83P	Biochemical Eng. Laboratory.	2.8	2.9	2.9	2.95	
ChBC-84	Modeling and Simulation in Chem.Eng.	2.95	2.94	2.92	2.93	2.93
ChBC-85	Industrial Pollution Abatement	1.44	2.93	2.65	2	
ChBE-84	Nano-Science and Technology	2.94	2.94	2.95	2.95	
ChBE-82	Petroleum Refining	2.86	2.83	1.93	1.71	
HSBE-82	Entrepreneurship Development	2.9	2.1	2.1	2.1	
ChBE-83	clean technology in process industries	3	2.6	1.8	2	

Table B.3.2.2h

CO Attainment for the Academic year 2018-2019

Course Code	Course Name	CO1	CO2	CO3	CO4	CO5
CHM-101	Chemistry-I	2.9	1.5	1.7	2.1	
PHY-101	Physics-I	3	2.4	2	1.3	3
MTH -101	Mathematics-I	2.5	2.5	2.2	1.2	1.3
HSS 101	Communication Skills & Oral Presentation	2.7	2.7	2.7	2.1	
IT-101	Comp. Fundam. & Prob. Solving Techn.	2.0	2.1	2.1	2.1	
CIV- 102	Engineering Drawing	0.74	0.73	0.74	0.71	
CHM-101 P	Chemistry-I Laboratory	2.8	2.9	2.8	2.9	
PHY-102 P	Physics-I Laboratory	2.9	2.8	2.9	2.8	
IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.3	2.2	2.2	2.1	
WSP-I	Workshop Practices- I	3	3	2.1	3	2.5
CHM-201	Chemistry-II	2.9	2.9	2.9	2.2	
PHY-201	Physics-II	3	1.8	0.3	0.3	
MTH-201	Mathematics-II	2.1	2.5	2.1	1.5	1.6
HSS-201	Introduction To Social Sciences	2.7	2.0	2.7	2.2	2.0
CSE-201	Computer Programming	2.5	2.3	1.6	1.3	1.9
CIV-201	Strength of Materials	2.1	1.8	2.3	2.6	2.3
MED-201	Machine Drawing	1.5	1.2	0.7	1.2	
CHM-201 P	Chemistry-II Laboratory	2.9	2.9	2.9	2.9	2.9
PHY-201 P	Physics-II Laboratory	2.9	2.9	2.9	2.9	2.9
CSE-202 P	Computer Programming Laboratory	2.26	2.16	2.36	2.16	
WSP-II	Workshop Practices-II	2.4	2.1	2.9	2.9	2.9
ChBC-31	Introduction to Chemical Eng.	2.1	2.2	2.2	2.2	2.1
ChBC-32	Material and Energy Balance	2.8	2.7	2.7	2.6	
ChBC-33	Process Fluid Mechanics	1.5	2.2	1.4	2.2	
ChBC-34	Thermodyn. & Chem.Kinetics	1.9	1.5	1.3	0.6	
EEBC-31	Basic Elect. & Electronics Eng.	2.3	2.5	2.4	2.1	2.1
HSBC-31	Ethics and Self Awareness	2.1	2.9	2.1	1.3	
MTBC-31	Chemical Eng. Mathematics-I	2.6	2.0	1.8	1.3	2.6
ChBC-41	Chemical Eng. Thermodynamics	2.4	1.5	1.7	0.5	
ChBC-42	Heat Transfer	2.9	2.2	2.2	2.2	
ChBC-43	Mechanical Operations	1.4	2.9	2.2	0.5	0.8
ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2.9	2.9	2.9	2.9	
ChBC-45	Mass Transfer -I	2.7	2.5	2.5	2.5	
ChBS-41	Seminar	2.9	1.4	2.9	1.9	
EEBC-41P	Basic Ele. & Electron. Eng. Laboratory.	2.37	2.47	1.86	2.0	2.27
MTBC-41	Chemical Eng. Mathematics –II	3.0	2.8	3.0	2.3	

ChBC-51	Process Equipment Design – I (Mechanical Aspects)	2.9	2.4	0.8	2.1	2.2
ChBC-52	Chemical Reaction Eng.	1.5	1.9	2.2	1.7	
ChBC-53	Material Science & Technology	2.9	2.7	2.7	2.0	
ChBC-54	Chemical Technology – I	2.4	2.5	1.7	1.4	
ChBC-55	Mass Transfer -I	1.2	1.1	1.1	1.1	
ChBS-56P	Heat Transfer Laboratory.	2.9	2.7	2.7	2.7	2.8
HSBC-51	Basic Management Principles	2.1	2.1	2.9	2.1	
ChBC-61	Process Equipment Design -II (Process Aspect)	0.8	2.4	1.7	2.1	2.2
ChBC-62	Mass Transfer – II	2.9	2.91	2.9	2.8	
ChBC-63	Chemical Technology – II	2.9	2.9	2.9	2.2	
ChBC-64	Energy Eng.	2.9	2.1	2.2	2.1	
ChBC-65P	Energy Eng. Laboratory.	2.4	2.0	2.6	2.0	
ChBC-66	Process Instrumentation	2.9	2.0	1.0	1.9	
ChBC-67	Transport Phenomena	2.0	2.9	1.5	0.7	
ChBC-68P	Thermodynamics & Reaction Eng. Laboratory.	2.9	2.9	2.9	2.9	
ChBC-69	Industrial Training & Presentations	2.9	2.9	2.9	2.9	
ChBP-71	Pre-project work	2.8	2.9	2.9	2.5	
ChBC-72	Chemical Process Safety	2.9	2.4	1.2	2.1	
ChBC-73	Process Dynamics & Control	1.6	1.4	2.2	0.8	
ChBC-74P	Process Dynamics & Control Laboratory	2.8	2.1	2.9	2.9	
ChBC-75	Process Econ.& Plant Design	2.5	1.7	1.8	1.2	
ChBC-76	Biochemical Eng.	2.87	2.85	2.93	2.92	
ChBC-77P	Mass Transfer Laboratory.	2.7	2.7	2.7	1.6	
HSBE-71	Human Resource Development	2.9	2.1	2.9	1.3	
MTBE-71	Operation Research	2.8	3.0	3.0	2.3	
HSBE-72	Managerial Econ. for Engineers	2.9	2.1	2.1	2.1	
ChBE-74	Computational Fluid Dynamics	1.3	1.4	1.4	1.2	
ChBP-81	Project	2.8	2.9	2.9	2.5	2.8
ChBC-82	Bioresource Technology	2.8	2.9	2.9	2.9	
ChBC-83P	Biochemical Eng. Laboratory.	2.3	2.5	2.6	2.3	
ChBC-84	Modeling and Simulation in Chem. Eng.	2.9	1.7	1.5	1.7	2.4
ChBC-85	Industrial Pollution Abatement	1.1	1.7	0.7	2.1	
ChBE-82	Petroleum Refining	2.9	2.4	1.7	2.1	
ChBE 81	Process Heat Integration	3.0	3.0	2.5	1.3	
HSBE-82	Entrepreneurship Development	2.9	2.1	2.1	2.1	
ChBE-82	Fuel Cell Technology	2.3	2.7	2.8	0.8	

Table B.3.2.2i

CO Attainment for the Academic year 2017-2018

Course Code	Course Name	CO1	CO2	CO3	CO4	CO5
CHM-101	Chemistry-I	2.21	2.9	1.47	1.18	
PHY-101	Physics-I	3	2.4	2	1.3	
MTH -101	Mathematics-I	2.21	2.91	2.66	2.13	1.49
HSS 101	Communication Skills & Oral Presentation	2.08	2.11	2.07	2.09	
IT-101	Computer Fundamentals And Problem Solving Techniques	2.0	2.1	2.1	2.1	
CIV- 102	Engineering Drawing	1.45	2.16	1.2	2.12	
CHM-101 P	Chemistry-I Laboratory	2.9	2.9	2.9	2.8	
PHY-102 P	Physics-I Laboratory	2.9	2.8	2.9	2.9	
IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	2.16	2.06	2.26	2.13	
WSP-I	Workshop Practices- I	2.2	3	1.6	3	3
CHM-201	Chemistry-II	2.93	2.43.	2.91	1.43	
PHY-201	Physics-II	3	1.8	0.3	0.3	
MTH-201	Mathematics-II	2.43	2.9	1.95	2.19	2.19
HSS-201	Introduction To Social Sciences	2.66	2.63	1.94	2.64	2.2
CSE-201	Computer Programming	1.56	2.04	2.04	1.12	1.69
CIV-201	Strength of Materials	2	3	3	2	3
MED-201	Machine Drawing	1.5	1.4	1.2	0.9	
CHM-201 P	Chemistry-II Laboratory	2.93	2.91	2.91	2.87	
PHY-201 P	Physics-II Laboratory	2.9	2.9	2.8	2.9	
CSE-202 P	Computer Programming Laboratory	1.7	1.7	1.1	1.5	
WSP-II	Workshop Practices-II	2.4	2.9	2.1	2.9	2.9
ChBC-31	Introduction to Chemical Eng.	2	1.98	2.2	2.104	1.78
ChBC-32	Material and Energy Balance	2.94	2.92	2.20	2.15	
ChBC-33	Process Fluid Mechanics	2.15	1.64	1.69	1.66	
ChBC-34	Thermodynamics and Chemical Kinetics	2.4	1.5	1.8	1.4	
EEBC-31	Basic Electrical Eng.	2.32	2.52	2.44	2.08	2.08
EEBC-32P	Basic Electrical Eng. Laboratory.	2.37	2.57	1.96	2.1	2.37
MTBC-31	Chemical Eng. Mathematics-I	2.5	1.8	2.1	1.3	
ChBC-41	Chemical Eng. Thermodynamics	2.86	1.47	2.23	0.56	
ChBC-42	Heat Transfer	2.22	1.74	1.68	2.15	
ChBC-43	Mechanical Operations	2.6	3	2.7	0.9	0.6
ChBC-44P	Fluid Mechanics & Mechanical Operations Laboratory	2.88	2.86	2.82	2.8	
HSBC41	Ethics and Self Awareness	2.1	2.1	2.88	1.31	
ChBS-41	Seminar	2.94	1.48	2.92	1.91	
EEBC-41	Basic Electronics Eng.	2.12	2.68	2.60	2.22	

EEBC-41P	Basic Electronics Eng. Laboratory	2.27	2.37	1.76	2.0	2.17
MTBC-41	Chemical Eng. Mathematics –II	2.3	2.8	2.5	1.8	
ChBC-51	Process Equipment Design – I (Mechanical Aspects)	0.75	2.17	2.2	1.68	0.73
ChBC-52	Chemical Reaction Eng.	2.7	2.1	2.3	1.5	
ChBC-53	Material Science & Technology	3	3	2.76	2.08	
ChBC-54	Chemical Technology – I	2.9	2.9	2.9	1.7	
ChBC-55	Mass Transfer -I	1.25	1.36	1.36	1.17	
ChBS-56P	Heat Transfer Laboratory.	2.75	2.78	2.84	2.66	2.55
HSBC-51	Basic Management Principles	2.9	2.1	2.91	1.31	
ChBC-61	Process Equipment Design -II (Process Aspect)	2.19	2.65	2.2	1.68	2.16
ChBC-62	Mass Transfer – II	2.7	2.81	2.81	2.7	
ChBC-63	Chemical Technology – II	2.92	2.91	2.91	2.14	
ChBC-64	Energy Eng.	2.88	2.86	2.13	2.12	
ChBC-65P	Energy Eng. Laboratory.	2	2	2.1	2	
ChBC-66	Process Instrumentation	2.91	2.89	2.17	2.15	
ChBC-67	Transport Phenomena	2.43	2.41	1.96	1.68	
ChBC-68P	Thermodynamics and Reaction Eng. Laboratory.	2.9	2.9	2.9	2.9	
ChBC-69	Industrial Training & Presentations	2.91	2.89	2.92	2.88	
ChBP-71	Pre-project work	2.6	2.3	2.5	2.2	
ChBC-72	Chemical Process Safety	2.9	2.9	2.1	2.1	
ChBC-73	Process Dynamics & Control	2.8	2.4	2.1	2.2	
ChBC-74P	Process Dynamics & Control Laboratory	2.6	2	2.8	2.4	
ChBC-75	Process Economics & Plant Design	2.55	1.91	1.81	1.52	
ChBC-76	Biochemical Eng.	2.86	2.84	2.91	2.9	
ChBC-77P	Mass Transfer Laboratory.	2.65	2.35	2.35	1.67	
MTBE-71	Operation Research	3	3	3	2.3	
HSBE-72	Managerial Econ. for Engineers	2.9	2.11	2.1	2.12	
ChBP-81	Project	2.6	2.3	2.5	2.2	
ChBC-82	Bioresource Technology	2.84	2.82	2.82	2.82	
ChBC-83P	Biochemical Eng. Laboratory.	2.1	2.3	2.4	2.1	
ChBC-84	Modeling and Simulation in Chem. Eng.	2.87	2.53	2.3	1.06	1.49
ChBC-85	Industrial Pollution Abatement	2.6	2.7	2.5	2.1	
ChBE-82	Petroleum Refining)	2.9	2.9	1.8	2.1	
HSBE-82	Entrepreneurship Development	2.88	2.13	2.11	2.08	

Table B.3.2.2j

3.3. Attainment of Program Outcomes and Program Specific Outcomes (75) Claimed 75

3.3.1. Describe assessment tools and processes used for measuring the attainment of each Program Outcome and Program Specific Outcomes (10) Claimed 10

(A) List of PO and PSO assessment tools and processes

i. PO and PSO Assessment Process

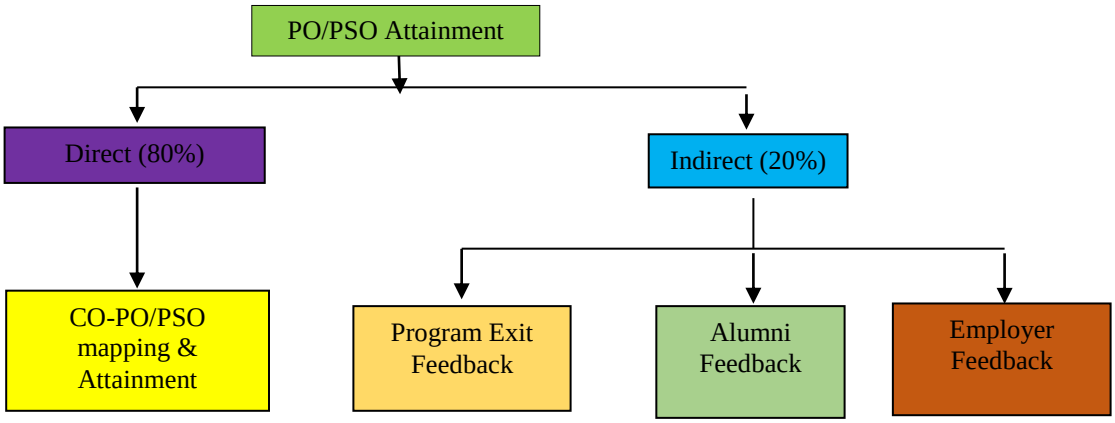


Figure B.3.3 a

PO/PSO assessment is done by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is based on CO attainment obtained and the corresponding CO-PO/PSO mapping (Section 3.1.2). Indirect assessment is done through Program exit survey, Alumni survey, Employer survey and Academician feedback. Program exit survey and alumni survey are given a weightage of 50% and 40%, respectively and Employer survey is given a weightage of 10% each.

ii. PO and PSO Assessment Tools

The various direct and indirect assessment tools used to evaluate POs & PSOs and the frequency with which the assessment processes are carried out are listed in Table 3.3.1a.

Table 3.3.1 (a) Assessment tools used for evaluation of PO and PSO attainment

		Course	**Assessment Tools**	**Frequency**
Direct (80% weightage)	CO Assessment	Theory	Midterm	once/course
			Continuous Assessment	Weekly
			Major	Once/course

		Laboratory		Continuous Assessment (Report, Experiments)	Daily
				Major Lab Exam (Viva Voce, perform a given experiment)	Once/lab course
		Seminar		Presentation	Twice/Course
				Report	Once/course
		Project	7^{th} Semester	Mid-Term Evaluation	Once/course
				End- Term Evaluation	Once/course
			8^{th} Semester	Mid-Term Evaluation	Once/course
				End- Term Evaluation (Demonstration and evaluation by External Examiner)	Once/course
Indirect (20% weightage)	Surveys	Program Exit Survey			Once in a year
		Employer Survey			Once in a year
		Alumni Survey			Once in a year

Table B.3.3.1a

(B) Quality / relevance of assessment tools and processes:

i. Direct Assessment Tools and Process

Direct assessment tools described in section 3.2.1 are used for the direct assessment of POs and PSOs. Initially, the attainment of each course outcome is determined as described in section 3.2.2. The attainment of each PO corresponding to a course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. Similarly, the values of PSO attainment are also determined. By factoring the attainment of Cos,

PO attainment = (PO mapping level/3) *CO attainment
PSO attainment = (PSO mapping level/3) *CO attainment

ii. PO/PSO attainment of a course (sample)

Chemical Reaction Engineering (ChBC-52) **SESSION: AUTUMN-2018**

		POs																							PSOs					
COs	**CO Attain**	**1**	**Attain**	**2**	**Attain**	**3**	**Attain**	**4**	**Attain**	**5**	**Attain**	**6**	**Attain**	**7**	**Attain**	**8**	**Attain**	**9**	**Attain**	**10**	**Attain**	**11**	**Attain**	**12**	**Attain**	**1**	**Attain**	**2**	**Attain**	**3**	**Attain**
1.0	1.5	3	1.5	2	1	2	1	2	1	1	0.5			0				2	1					2	1	3	1.5	1	0.5	3	1.5
2.0	1.9	3	1.9	3	1.9	3	1.9	3	1.9	3	1.9	2	1.3	2	1.3	2	1.3	2	1.3			2	1.3	2	1.3	3	1.9	2	1.3	3	1.9
3.0	2.2	3	2.2	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5							2	1.5	3	2.2	1	0.7	3	2.2
4.0	1.7	3	1.7	3	1.7	3	1.7	3	1.7	3	1.7	2	1.1	2	1.1									3	1.7	3	1.7	1	0.6	3	1.7
Avg. PO Attain	1.83		1.83		1.53		1.53		1.53		1.4		1.3		1.3		1.4		1.15				1.3		1.38		1.83		0.78		1.83

PO & PSO ATTAINMENT CALCULATION (IN-DIRECT ASSESSMENT)

Employer's feedback, Alumni Feedback & Student exit survey is considered for this purpose. In Students exit survey, a questionnaire was designed for this purpose and the average responses of the outgoing students for each PO is computed.

Given below is the indirect PO/PSO values calculated for the year 2018-2019

POs & PSOs	Attainment levels
PO1	2
PO2	1.9
PO3	1.7
PO4	1.8
PO5	1.8
PO6	1.9
PO7	2
PO8	2.1
PO9	2.1
PO10	2.2
PO11	2.2
PO12	2.2
PSO1	2.8
PSO2	2.2
PSO2	1.9

Table B.3.3.1b

OVERALL PO ATTAINMENT CALCULATIONS

Direct Assessment + In Direct Assessment

Finally, overall PO/PSO attainment values are computed by adding direct and indirect PO attainment values in the proportion of 80:20 respectively i.e. 80% weightage for direct assessment and 20% for indirect assessment

Overall PO/PSO attainment = (80% Direct + 20% Indirect)

PO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
Indirect Attainment	2	1.9	1.7	1.8	1.8	1.9	2	2.1	2.1	2.2	2.2	2.2	2.8	2.2	1.9
Direct Attainment	1.83	1.53	1.53	1.53	1.4	1.3	1.3	1.4	1.15		1.3	1.38	1.83	0.78	1.83
Overall PO/PSO Attainment	1.9	1.6	1.6	1.6	1.5	1.4	1.4	1.5	1.3	2.2	1.5	1.5	2	1.1	1.8

Table B.3.3.1c

iii. Indirect Assessment Tools and Process

Indirect assessment is done through program exit survey, alumni survey and employer survey. Program exit survey and alumni survey are given a weightage of 50% and 40%, respectively and Employer survey, 10%.

(1) Program Exit Survey:

An exit survey is conducted for students who have graduated out of the department for that year. The questionnaire format in the exit survey form to evaluate the attainment of POs and PSOs is **given in section (a) and relation of POs & PSOs with each question is given in section (b).**

(a) Questionnaire Format.

<table>
<tr><td colspan="4"><u>National Institute of Technology, Srinagar</u>
Chemical Engineering Department
Exiting Students Survey</td></tr>
<tr><td colspan="2">Name:</td><td colspan="2">Enrol. No:</td></tr>
<tr><td colspan="2">Phone No.</td><td colspan="2">Email:</td></tr>
<tr><td colspan="4">Assessment of Abilities, Skills and Attributes acquired at NIT Srinagar.
Please rate each of the following items in terms how well your education at NIT Srinagar prepared you for them.</td></tr>
<tr><td>1</td><td colspan="3">Basic knowledge in mathematics, science, engineering and humanities.</td></tr>
<tr><td></td><td>Extremely Satisfied</td><td>Satisfied</td><td>Not Satisfied</td></tr>
<tr><td>2</td><td colspan="3">Ability to identify, analyse and solve chemical engineering problems</td></tr>
<tr><td></td><td>Extremely Satisfied</td><td>Satisfied</td><td>Not Satisfied</td></tr>
<tr><td>3</td><td colspan="3">Ability to design and develop solutions for chemical engineering problems</td></tr>
<tr><td></td><td>Extremely Satisfied</td><td>Satisfied</td><td>Not Satisfied</td></tr>
<tr><td>4</td><td colspan="3">Ability to investigate the complex chemical engineering problems and their solutions</td></tr>
</table>

	Extremely Satisfied	**Satisfied**	**Not Satisfied**
5	Use of modern research-based knowledge and research methods		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
6	Demonstrate the ability to apply advanced technologies to solve contemporary and new problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
7	Understanding professional engineering solutions in societal and environmental contexts		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
8	Understanding of professional and ethical responsibility		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
9	Ability to function as an effective member in multi-disciplinary teams		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
10	Proficient in English language in both communicative and technical forms		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
11	Demonstrate the ability to choose and apply appropriate resource management techniques		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
12	Capable of self-education and clearly understand the value of updating their professional knowledge to engage in life-long learning		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

13	Ability to apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc..		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
14	Ability to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
15	Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

(b) Relation of POs and PSOs with questionnaire:

POs/PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15

(c) Evaluation Process

The questionnaire consists of 15 questions which is relevant for assessing each PO and PSO. The first 12 questions correspond to the 12 POs and the remaining 3 questions are for PSOs. Each question is having 3 options, namely, extremely contented, contented and somewhat contented, which is given marks 3, 2 and 1 respectively. The survey results are tabulated and the average values corresponding to each PO and PSO are calculated.

(2) Employer Survey:

- Provides general information on current industry trends.
- Desirable graduate attributes.
- Overall perceptions of program quality.

- Strengths and expectations of graduates.
- Typically collected every two years

Feedback is taken at a frequency of once in a years from the employers who had given jobs to our graduates. The questionnaire format in the employer survey form to evaluate attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with each question is given in section (b).

(a) Questionnaire Format

<table>
<tr><td colspan="5"><u>National Institute of Technology, Srinagar</u>
Chemical Engineering Department
EMPLOYER SURVEY FORM</td></tr>
<tr><td colspan="5">The purpose of this survey is to obtain Employer’s input on the quality of education of undergraduate programs in NIT, Srinagar. Your sincere cooperation would enable us to improve the quality of our graduates as per your requirements</td></tr>
<tr><td colspan="2">Name of Company/ Organization</td><td colspan="3"></td></tr>
<tr><td colspan="2">Mailing address</td><td colspan="3"></td></tr>
<tr><td colspan="2">Sector Private/Public/Academia</td><td colspan="3"></td></tr>
<tr><td colspan="2">What are the pertinent employability skills to stay updated in current industry trends and thereby improve the quality of the undergraduate program?</td><td>Logical Thinking</td><td>Good Aptitude</td><td>Excellent Communication</td></tr>
<tr><td colspan="5">Rate the NIT Srinagar Graduates working in your organization using the following criterion.
Put tick mark for Knowledge, Skills, Abilities, Attitude and other Attributes expected out of NIT Srinagar graduates.
On a scale of 1 to 3 [Excellent(3), Good(2), Satisfied(1)]</td></tr>
<tr><td>No.</td><td colspan="2">Overall, are you satisfied with</td><td colspan="2">Rating</td></tr>
<tr><td>1</td><td colspan="2">Capacity for development and analysis of engineering problems and formulation of appropriate solutions, retaining professional and ethical responsibilities.</td><td colspan="2"></td></tr>
<tr><td>2</td><td colspan="2">Aptitude for self-education, ability to learn new skills and a clear appreciation for the value of life-long learning to update professional knowledge.</td><td colspan="2"></td></tr>
<tr><td>3</td><td colspan="2">Understanding professional engineering solutions for sustainable development and their application in global, national and societal contexts.</td><td colspan="2"></td></tr>
</table>

4	Competence for acquiring new skills and applying them in research and development by applying various physiochemical and biological techniques	
5	Fundamental knowledge in mathematics and science and professional fluency in English both communicative and technical forms.	
6	Dexterity in differentiation of management techniques and possession of leadership skills that enable successful function of multi-disciplinary teams.	
	Signature	**Name and Designation**

(b) Relation of POs and PSOs with questionnaire:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q5	Q1	Q1	Q4	Q2 &Q4	Q3	Q3	Q1	Q6	Q5	Q6	Q2

PSOs	PSO1	PSO2	PSO3
Questions	Q3	Q1	Q4

(c) Evaluation Process

The questionnaire consists of 6 questions. These questions are relevant for assessing each PO and PSO. If multiple questions satisfy a PO, then their average is taken. Similar procedure is followed for PSOs also. Each question is having 3 options namely, extremely contented, contented and somewhat contented, which is given marks 3, 2 and 1 respectively. These marks are tabulated and the average values corresponding to each PO and PSO are determined.

(3) Alumni Survey: It is done once in a year.

- Measures the degree to which past students believes they achieved program-level learning outcomes.
- Overall satisfaction with the program.
- Overall satisfaction with the program delivery.
- Information on current professional or academic status.

Feedback is taken from alumni. The questionnaire format in the alumni survey form to evaluate Attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with each question is given in section (b).

(a) Questionnaire Format

National Institute of Technology Srinagar **Alumni Survey Form**		
Thank you for taking the time to fill out this questionnaire. All the information will be kept confidential and will be used only for statistical purposes. As an alumnus, your opinions are valued and are utilized to help us make periodic changes and updates for continuous improvement of our undergraduate program		
Alumni name		
Year of Graduation		
Mailing address		
Placement	**Before/after graduation**	**Core/Software**
Name of the Company		
Please rate each of the following skills, abilities or attributes in terms of their importance to state how well your education at **Chemical Engineering Department, National Institute of Technology, Srinagar** prepare you for these.		
Skills, Abilities and Attributes		**Scale (1 to 3) Excellent to poor**
Apply Knowledge of mathematics, Basic sciences and Engineering		
Problem Identification and Analysis		
Design a system and develop solution to the problem		
Investigate and Handle complex problems		
Ability to use techniques and tools in engineering practice		
Understand and appreciate the impact of engineering in the societal and global contexts		
Awareness of existing issues (e.g. Economics of engineering, Environmental issues)		
Understand professional and ethical responsibilities as an engineer (e.g., safety, professional ethics, code of conduct)		
Function effectively in teams		
Proficient in English language in both communicative and technical forms		
Project Management and Finance		
Awareness of the need for life-long learning (Seeking further education, self-learning, Membership in professional societies)		
Ability to apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc		
apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts		
Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques		
Signature	**Suggestion if any:**	

(a) Relation of POs and PSOs with questionnaire

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
PSOs	PSO1				PSO2				PSO3			
Questions	Q13				Q14				Q15			

(b) Evaluation Process

(c) The questionnaire consists of 15 questions which are relevant for assessing each POs and PSOs. The first 12 questions are used to evaluate POs and the remaining 3 questions are for evaluating PSOs. The marks given are tabulated and the average values corresponding to each PO and PSO are determined.

Overall indirect PO/PSO Attainment for the Academic Year 2019-2020 is shown as under.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
Exiting Students Survey	2.2	2.1	2.1	2.0	1.9	2.0	2.3	2.5	2.4	2.4	2.4	2.2	2.1	2.1	2.0
Alumni Survey	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.4	2.5	2.48	2.41	2.27	2.33	2.30	2.27
Employers Survey	2.2	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.1	2.22	2.11	2.33	2.33	2.44	2.44
Overall indirect PO Attainment	2.3	2.4	2.4	2.3	2.2	2.2	2.3	2.5	2.4	2.38	2.29	2.27	2.24	2.29	2.24

Table B.3.3.1d

Overall indirect PO/PSO Attainment for the Academic Year 2018-19 is shown as under.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
Exiting Students Survey	2.1	1.9	1.1	2	2.2	2	2.5	2.3	2.3	2.2	2.8	2	3	2.6	1.8
Alumni Survey	2.1	2.2	2.2	1.5	1.5	1.8	1.6	2.1	2	2.3	1.9	2.5	2.6	1.8	2
Employers Survey	1.1	0.7	2.7	2	1	1.8	1.1	1.1	1.5	1.8	0.4	2	2.3	2	1.9
Overall indirect PO Attainment	2	1.9	1.7	1.8	1.8	1.9	2	2.1	2.1	2.2	2.2	2.2	2.77	2.22	1.89

Table B.3.3.1e

Overall indirect PO/PSO Attainment for the Academic Year 2017-18 is shown as under.

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
Exiting Students Survey	2	1.68	1.24	1.84	1.74	1.64	2.08	2.04	1.9	1.78	2.34	1.82	3	2.7	1.9
Alumni Survey	2.1	2.2	2.2	1.5	1.5	1.8	1.6	2.1	2.1	2.3	1.9	2.5	2.5	1.2	1.6
Employers Survey	1.1	1.1	2.2	1.8	3	2.3	2.1	2.2	2.1	3	1.2	2.2	2	1.9	1.6
Overall indirect PO Attainment	1.95	1.83	1.72	1.7	1.77	1.77	1.89	2.08	2	2.11	2.05	2.13	2.7	2.02	1.75

Table B.3.3.1f

3.3.2. Provide results of evaluation of each PO & PSO (65)

Claimed 65

For the Academic year 2019-2020

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
MEL100	Elements of Mechanical Engineering	2.57	1.91	1.91	0.46	0.44	0.45	0.47	0.49	0.47	1.92	0.46	2.53	2.53	1.90	2.53
PHL100	Engineering Physics	2.86	1.27	1.27	0.46	2.04	2.05	2.07	2.09	2.87	2.08	0.46	2.85	2.05	1.26	1.25
CIL100	Engineering Mechanics	1.45	1.46	1.07	1.06	0.44	1.11	0.79	0.49	0.47	0.48	0.46	0.45	1.11	0.73	1.05
HUL100	Basic English and Communication	0.46	0.47	0.47	0.46	0.44	1.17	0.47	0.49	1.67	2.61	1.50	1.35	0.45	0.46	0.45
CYL101	Environmental Studies	0.66	0.67	0.59	0.58	0.44	1.16	0.53	0.49	1.43	2.18	1.29	1.17	0.58	0.51	0.57
MAL100	Mathematics I	1.44	1.17	1.44	0.20	0.40	0.40	0.60	0.40	0.60	0.40	0.85	0.71	1.28	1.64	0.92
HUP100	Language Laboratory	0.46	0.47	0.47	0.46	0.44	0.45	0.47	0.49	1.05	1.83	1.03	0.84	0.45	0.46	0.45
PHP100	Physics Laboratory	0.75	0.69	0.74	0.42	0.42	0.79	0.52	0.46	1.18	1.75	1.16	1.01	0.69	0.76	0.59
WSP100	Work shop Practice	2.86	1.27	1.27	0.46	2.04	2.05	2.07	2.09	2.87	2.08	0.46	2.85	2.05	1.26	1.25
HUL101	Advanced English Comm.Skills &	0.46	0.47	0.47	0.46	0.44	1.40	0.47	0.49	1.61	2.58	1.47	1.21	0.45	0.46	0.45
EEL100	Basic Electrical Engineer	2.08	1.91	1.41	1.43	1.69	1.35	1.26	0.49	0.47	0.48	1.71	1.38	1.68	1.74	1.86
TL100	Computer Programming	1.90	1.67	1.83	1.50	1.48	0.45	0.47	0.49	0.47	0.48	0.46	1.89	2.13	1.42	1.17
CYL100	Engineering Chemistry	2.00	2.25	1.75	0.25	0.00	1.25	2.00	0.25	0.25	1.50	0.50	2.25	2.25	2.25	1.75
CIP100	Engineering Drawing	2.77	2.78	2.78	2.76	1.59	1.60	1.81	2.03	0.47	0.48	2.77	1.99	2.76	2.00	1.99
MAL101	Mathematics II	2.32	1.84	2.32	0.20	0.40	0.40	0.60	0.40	0.60	0.40	1.08	0.88	1.88	2.52	1.36
ELP100	Basic Electrical Engineer Laboratory	2.16	2.07	1.45	1.43	1.68	1.22	1.34	0.49	0.47	0.48	1.71	1.38	1.68	1.74	1.86
CYP100	Chemistry Laboratory	2.01	2.19	2.01	1.20	0.44	1.42	1.99	1.24	1.21	1.62	1.95	2.00	2.13	2.20	1.80
ITP100	Computer Programming Laboratory	1.98	1.99	2.07	1.58	1.96	0.45	0.47	0.49	1.03	0.48	0.46	1.97	1.41	1.98	1.25
ChBC-31	Introduction to Chemical Eng.	1.90	1.81	1.62	0.46	0.92	2.18	1.11	1.77	0.47	0.48	1.10	1.09	2.15	2.16	2.10
ChBC-32	Material and Energy Balance	1.38	1.39	1.39	1.38	1.36	0.45	0.47	0.49	0.47	0.48	0.46	0.45	1.37	1.38	1.37
ChBC-33	Process Fluid Mechanics	1.83	1.68	1.84	1.36	0.89	0.45	0.47	0.49	0.47	0.48	0.46	1.37	1.82	1.37	0.90
ChBC-34	Thermodynamics and Chem.	1.78	1.45	1.21	1.34	0.44	0.45	0.47	0.49	0.47	0.48	1.75	1.57	1.33	1.43	1.33
EEBC-31	Basic Electrical & Electronics Eng.	2.16	2.06	1.49	1.36	1.79	1.45	1.26	0.49	0.49	0.47	1.79	1.3	1.65	1.7	1.8
HSBC-31	Ethics and Self Awareness	0.458	0.472	1.654	0.456	0.438	1.632	1.426	1.676	1.374	1.58	1.642	1.638	0.448	0.458	0.448
MTBC-31	Chemical Eng. Mathematics-I	1.71	1.86	1.72	1.7	0.44	0.45	0.47	0.49	0.47	1.03	0.46	0.73	1.14	1.84	1
ChBC-41	Chemical Eng. Thermodynamics	1.55	1.52	1.26	1.37	0.44	0.45	0.47	0.49	0.47	0.48	1.75	1.66	1.36	1.51	0.90
ChBC-42	Heat Transfer	2.67	2.68	2.49	2.14	0.44	1.54	1.56	0.49	0.47	0.48	0.46	1.93	1.93	2.67	1.18
ChBC-43	Mechanical Operations	2.17	1.84	1.69	1.62	0.44	1.5	1.9	0.49	0.47	0.48	0.46	1.29	2.07	1.98	1.97

ChBC-44P	Fluid Mechanics & Mech.	2.03	2.05	1.26	2.82	0.44	0.45	0.47	0.49	0.47	0.48	0.46	0.45	2.02	1.25	2.02
ChBC-45	Mass Transfer -I	1.33	1.34	1.34	1.03	1.3	0.93	1.1	0.99	2.35	0.75	0.74	0.97	1.32	0.89	1.03
ChBS-41	Seminar	2.71	1.58	1.78	1.77	2.69	1.77	1.78	1.60	0.66	2.62	1.40	2.14	1.76	1.21	2.13
EEBC-41P	Basic Elect. & Electronics Eng.	2.26	2.10	1.55	1.49	1.79	1.39	1.33	0.49	0.49	0.47	1.70	1.38	1.68	1.74	1.86
MTBC-41	Chemical Eng. Mathematics –II	2.26	2.47	2.27	2.26	0.44	0.45	0.47	0.49	0.47	1.28	0.46	0.85	1.45	2.46	1.25
ChBC-51	Process Equipment Design – I	2.35	2.06	2.05	1.39	2.02	1.56	1.72	0.49	0.81	0.77	1.73	1.71	2.34	1.89	2.31
ChBC-52	Chemical Reaction Eng.	2.27	1.95	1.95	1.93	1.72	1.28	1.29	1.08	1.14	0.48	0.75	1.79	2.26	1.21	2.26
ChBC-53	Material Science & Technology	1.31	1.48	1.65	1.77	1.43	0.96	1.48	0.67	0.47	0.48	0.60	2.00	1.30	1.35	1.67
ChBC-54	Chemical Technology – I	1.50	1.51	1.74	1.48	1.48	1.35	1.93	0.88	0.47	0.48	0.78	2.57	1.35	0.46	1.10
ChBS-55P	Heat Transfer Laboratory.	2.40	2.11	2.55	2.69	0.44	1.94	2.33	0.49	0.47	0.48	0.46	1.95	2.05	2.23	1.86
HSBC-51	Basic Management Principles	0.46	1.58	1.28	1.50	0.44	1.32	1.51	1.55	1.53	1.52	1.65	1.65	1.64	1.65	1.64
MTBC-51	Numerical Methods	2.19	2.41	2.21	2.2	0.44	0.45	0.47	0.49	0.47	1.25	0.46	0.84	1.41	2.38	1.22
ChBC-61	Process Equipment Design -II	1.96	1.81	1.81	1.22	1.69	1.40	1.47	0.49	0.93	0.57	1.46	1.45	1.95	1.63	1.83
ChBC-62	Mass Transfer – II	2.81	2.82	2.82	2.81	0.44	0.45	0.47	0.49	0.47	0.48	0.46	0.45	2.80	2.81	2.80
ChBC-63	Chemical Technology – II	1.28	1.30	1.37	1.18	1.29	1.14	1.55	0.84	0.47	0.48	0.65	2.05	1.14	0.46	0.93
ChBC-64	Energy Eng.	2.80	2.42	2.42	2.40	2.39	1.81	1.83	1.26	1.25	0.48	0.85	2.21	2.79	1.43	2.79
ChBC-65P	Energy Eng. Laboratory.	1.88	1.26	1.26	1.09	1.70	1.71	2.35	0.49	1.73	0.48	1.75	1.72	1.39	1.72	1.71
ChBC-66	Process Instrumentation	2.57	1.88	0.77	1.86	1.84	0.45	0.47	0.49	0.47	0.48	0.46	0.45	2.56	2.06	1.85
ChBC-67	Transport Phenomena	1.90	1.91	1.91	1.55	1.35	1.27	1.43	1.16	0.47	0.48	1.75	1.41	1.89	1.90	1.89
ChBC-68P	Thermodynamics and Rxn Eng.	2.17	1.77	1.39	1.23	1.76	1.78	2.54	1.66	1.82	1.67	1.75	1.85	1.79	1.81	1.75
ChBC-69	Industrial Training & Presentations	2.52	2.50	2.07	1.51	1.51	1.14	0.79	1.19	1.18	1.96	1.39	1.96	2.29	2.17	1.93
ChBP-71	Pre-project work	1.8	1.49	1.31	1.46	1.78	1.46	1.14	1.16	1.81	1.66	1.75	1.8	1.79	2.31	1.95
ChBC-72	Chemical Process Safety	2.62	2.63	1.89	2.43	1.86	2.05	2.63	1.01	2.07	2.12	2.25	1.92	2.44	2.08	1.69
ChBC-73	Process Dynamics & Control	1.81	1.52	1.67	1.50	1.15	0.81	0.83	0.80	0.47	0.48	1.75	1.33	1.80	0.91	1.50
ChBC-74P	Process Dynamics & Control	1.86	1.18	1.17	1.16	1.84	2.55	0.47	0.49	1.87	0.48	1.86	1.85	1.85	1.86	2.55
ChBC-75	Process Economics & Plant Design	1.42	1.54	1.37	1.18	0.44	0.45	0.47	0.49	0.47	0.48	1.75	1.45	1.60	1.65	1.05
ChBC-76	Biochemical Eng.	1.85	1.83	1.79	1.81	1.42	1.98	2.00	1.72	0.96	1.50	0.44	1.50	1.85	1.83	1.79
ChBC-77P	Mass Transfer Laboratory.	2.69	2.7	2.7	2.68	1.91	0.44	0.46	0.49	2.7	2.7	1.19	1.19	2.68	1.93	1.92
HSBE-71	Human Resource Development	0.46	0.47	2.31	0.46	0.44	2.29	1.97	2.33	1.59	2.12	2.30	2.29	0.45	0.46	0.45
MTBE-72	Elective – II Numerical Analysis	2.2	2.4	2.2	2	0.4	0.4	0.6	0.4	0.6	1.2	0.6	0.8	1.6	2.6	1.2
ChBE-74	Computational Fluid Dynamics	1.7	1.72	1.52	1.51	1.2	1.28	1.19	2.46	2.35	0.9	0.87	0.97	0.96	1.07	1.28
ChBP-81	Project	1.76	1.13	1.13	1.11	1.74	2.41	1.12	1.15	1.77	2.44	1.75	1.76	1.75	2.28	1.75

ChBC-82	Bioresource Technology	2.79	2.80	2.80	2.59	1.99	2.78	2.79	2.24	1.05	1.84	0.46	1.81	2.78	2.59	2.78
ChBC-83P	Biochemical Eng. Laboratory.	2.77	2.59	2.21	2.00	2.37	1.80	1.63	1.64	1.24	1.44	1.82	2.00	2.18	2.19	2.24
ChBC-84	Modeling and Simulation in	2.80	2.82	2.81	2.80	2.00	2.01	0.47	0.49	0.47	0.48	0.46	2.02	2.79	2.80	2.79
ChBC-85	Industrial Pollution Abatement	1.97	2.28	1.79	2.26	1.54	2.25	2.27	0.49	0.47	0.48	0.46	0.45	2.25	2.26	2.25
ChBE-84	Nano-Science and Technology	2.62	2.11	1.45	1.44	0.44	0.45	0.47	0.49	0.47	0.48	0.46	0.45	1.82	1.05	0.84
ChBE-82	Petroleum Refining	2.32	1.83	1.83	0.96	1.67	1.50	1.71	1.86	0.83	0.93	0.70	1.70	2.31	1.59	2.31
HSBE-82	Entrepreneurship Development	0.46	0.47	2.31	0.46	0.44	1.67	1.51	1.72	1.29	1.61	1.68	1.68	1.67	0.46	0.45
ChBE-83	clean technology in process	1.71	1.20	1.25	1.23	0.54	0.61	0.98	0.49	0.47	0.48	0.46	0.45	1.70	1.07	1.83
Overall PO attainment		1.90	1.74	1.69	1.41	1.15	1.23	1.19	0.90	0.98	1.06	1.10	1.47	1.74	1.61	1.56

Table B.3.3.2a

For the Academic year 2018-2019

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CHM-101	Chemistry-I	1.9	1.6	1.1	0.4	0.4	0.4	0.4	0.4	0.4	1.4	0.4	1.9	1.7	1.0	1.6
PHY-101	Physics-I	0.7	0.7	0.6	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.7	0.6	0.4	0.4
MTH -101	Mathematics-I	1.6	1.4	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.6	1.4	1.5	1.0
HSS 101	Comm. Skills & Oral Presentation	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	1.9	2.1	2	0.4	0.6	0.4	0.4
IT-101	Computer Fundamentals And Problem Solving Techniques	1.9	1.2	0.6	0.4	0.9	0.4	0.4	0.4	0.4	0.4	0.4	1.9	0.56	0.44	0.38
CIV- 102	Engineering Drawing	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.4	1.0	1.0	0.8	1.0	1.1	1.0	1.0
CHM-101 P	Chemistry-I Laboratory	2.3	1.5	0.3	0.4	2.3	1.9	2.1	0.4	0.4	1.4	2.0	2.3	2.5	2.3	1.5
PHY-102 P	Physics-I Laboratory	0.74	0.68	0.73	0.73	0.68	0.38	0.4	0.42	0.42	0.44	0.44	1.01	0.59	0.74	0.49
IT 102 P	Computer Fundamentals And Problem Solving Techniques Lab	1.68	1.34	1.54	1.24	1.32	0.38	0.4	0.42	0.42	0.44	0.44	1.64	2.08	1.32	1.02
WSP-I	Workshop Practices- I	2.6	1.1	1.1	0.4	1.8	1.9	1.9	1.9	2.6	1.9	0.4	2.6	2.0	1.2	1.1
CHM-201	Chemistry-II	2.0	1.7	1.8	1.1	1.3	1.1	2.0	1.2	1.2	2.0	0.4	2.0	2.1	1.4	1.6
PHY-201	Physics-II	0.8	0.8	0.7	0.5	0.5	0.4	0.4		0.6	0.4	0.4	0.8	0.6	0.4	0.4
MTH-201	Mathematics-II	1.6	1.3	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.6	1.4	1.7	1.0
HSS-201	Introduction To Social Sciences	0.4	0.4	1.4	0.4	0.4	1.2	1.0	1.0	1.1	0.7	0.6	0.4	0.6	0.4	0.4
CSE-201	Computer Programming	1.8	1.5	1.7	1.3	1.3	0.4	0.4	0.4	0.4	0.4	0.4	1.8	2.1	1.2	0.9
CIV-201	Strength of Materials	2.2	2.1	1.4	1.4	0.4	1.5	1	0.4	0.4	0.4	0.4	0.4	1.7	1	1.4

MED-201	Machine Drawing	1.9	1.6	1.1	0.4	0.4	0.4	0.4	0.4	0.4	1.4	0.4	1.9	1.7	1.0	1.6
CHM-201 P	Chemistry-II Laboratory	2.3	1.5	0.3	0.4	1.9	1.9	2.1	0.4	0.4	1.5	2.0	2.3	2.5	2.4	1.5
PHY-201 P	Physics-II Laboratory	0.65	0.59	0.73	1.08	1.55	0.38	0.4	0.42	0.42	0.44	0.44	1.01	0.59	0.66	0.59
CSE-202 P	Computer Programming Laboratory	1.9	1.9	2.0	1.4	1.9	0.4	0.4	0.4	0.7	0.4	0.4	1.9	1.2	1.9	1.0
WSP-II	Workshop Practices-Ii	2.5	1.1	1.0	0.4	1.7	1.8	1.8	1.8	2.5	1.8	0.4	2.5	2.0	1.1	1.1
ChBC-31	Introduction to Chemical Eng.	1.6	1.2	0.9	0.4	0.6	1.1	0.8	0.6	0.4	0.4	0.6	1.6	1.94	1.82	1.76
ChBC-32	Material and Energy Balance	2.3	2.3	1.7	1.8	1.9	1.6	1.6	1.6	1	0.4	1.6	2.3	2.14	1.65	1.59
ChBC-33	Process Fluid Mechanics	1.9	1.7	1.8	1.3	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.9	2.03	1.81	0.87
ChBC-34	Thermodyn. & Chem.Kinetics	1.4	1.2	1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.4	1.25	1.28	1.07
EEBC-31	Basic Elect. & Electronics Eng.	2.6	1.8	1.6	2.3	1.8	1.5	0.4	0.4	0.4	0.4	2.2	1.6	2.2	2.0	2.1
HSBC-31	Ethics and Self Awareness	0.4	0.4	2	0.4	0.4	1.5	1.3	1.5	1.1	1.5	1.6	0.4	0.56	1.56	0.38
MTBC-31	Chemical Eng. Mathematics-I	1.6	1.6	1.7	1	1.2	0.4	0.4	0.4	0.4	0.4	0.4	1.6	1.72	1.9	0.38
ChBC-41	Chemical Eng. Thermodynamics	1.3	1.4	1.2	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.3	1.69	1.58	0.94
ChBC-42	Heat Transfer	2.3	2.3	2	1.8	0.4	1.4	1.4	0.4	0.4	0.4	0.4	2.3	1.83	2.34	1.01
ChBC-43	Mechanical Operations	1.7	1.5	1.3	1.2	0.4	1.3	1.5	0.4	0.4	0.4	0.4	1.7	1.76	1.64	1.58
ChBC-44P	Fluid Mech. & Mech. Oper. Lab	2	1.9	1.1	2.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2	2.11	1.22	1.93
ChBC-45	Mass Transfer -I	2	1.8	1.7	1.7	1.8	1.8	1.9	2.1	2	2.1	2.1	2	2.6	2.04	1.78
ChBS-41	Seminar	2.3	2.7	2.3	2.3	2.3	1.5	2.3	2.7	0.9	1.9	1.3	2.3	2	1.04	2.68
EEBC-41P	Basic Ele. & Electron. Eng. Lab	2	1.4	1.3	1.6	1.1	1.3	0.4	0.4	0.4	0.4	1.7	1.4	1.8	1.7	1.8
MTBC-41	Chemical Eng. Mathematics –II	1.9	1.7	1.2	1.3	0.4	0.4	0.4	0.4	0.4	1	0.4	1.9	2	1.16	1.66
ChBC-51	Process Equipment Design – I (Mechanical Aspects)	2.1	1.8	1.8	1	1.9	1.3	1.5	0.4	0.9	1	1.7	2.1	2.21	1.81	1.92
ChBC-52	Chemical Reaction Eng.	1.9	1.6	1.6	1.6	1.5	1.4	1.4	1.5	1.3	2.2	1.5	1.9	2	1.1	1.8
ChBC-53	Material Science & Technology	1.5	1.8	1.9	2.4	1.6	1.1	1.6	0.6	0.4	0.4	0.6	1.5	1.74	1.72	2.06
ChBC-54	Chemical Technology – I	1.7	1.6	1.3	0.4	0.4	0.4	0.4	0.4	0.4	1.7	0.4	1.7	1.62	1.69	0.92
ChBC-55	Mass Transfer -I	2.0	1.8	1.7	1.7	1.8	1.8	1.9	2.1	2.0	2.1	2.1	2.1	2.6	2.0	1.8
ChBS-56P	Heat Transfer Laboratory.	2.5	2.5	2.1	1.5	1.5	1.1	0.8	1.2	1.2	2	1.4	2.5	2.29	2.17	1.93
HSBC-51	Basic Management Principles	0.4	1.5	1.5	0.7	0.4	1	0.7	1.6	1.6	1.1	1.7	0.4	1.78	1.66	1.6
ChBC-61	Proc. Equip.Des. -II (Process Aspect)	1.9	1.7	1.7	1.1	1.6	1.3	1.4	0.4	0.9	0.5	1.4	1.9	2.03	1.57	1.74
ChBC-62	Mass Transfer – II	1.8	1.9	1.7	1.5	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.8	2.1	1.72	1.79

ChBC-63	Chemical Technology – II	1.5	1.5	1.6	1.4	1.5	1.3	1.8	0.8	0.4	0.5	0.8	1.5	1.48	0.44	1.11
ChBC-64	Energy Eng.	2.3	1.9	2	1.9	1.8	1.6	2.1	2.4	1.6	1.6	1.6	2.3	2.3	2.03	1.6
ChBC-65P	Energy Eng. Laboratory.	1.8	1.1	1.1	1	1.6	1.6	2.2	0.4	1.6	0.4	1.6	1.8	1.46	1.64	1.58
ChBC-66	Process Instrumentation	2	1.4	0.9	1.4	1.4	0.4	0.4	0.4	0.4	0.4	0.4	2	2.12	1.67	1.42
ChBC-67	Transport Phenomena	1.8	1.8	1.7	1.4	1.4	1.2	1.3	1	0.4	0.4	0.4	1.8	1.96	1.84	1.78
ChBC-68P	Thermody. and React. Eng. Lab	2.7	2.7	2.7	2.1	1.7	1.7	1.9	1.2	0.4	0.4	0.4	2.7	2.88	2.76	2.7
ChBC-69	Ind. Training & Presentations	2.5	2.5	2.1	1.5	1.5	1.1	0.8	1.2	1.2	2	1.4	2.5	2.29	2.17	1.93
ChBP-71	Pre-project work	1.9	1.1	1.1	1.1	1.8	2.5	1.1	1.1	1.9	2.6	2.7	1.9	2.04	2.49	1.86
ChBC-72	Chemical Process Safety	2.1	2.1	1.7	1.9	1.4	1.6	2.1	1.4	1.6	1.9	1.8	2.1	2.21	1.73	1.26
ChBC-73	Process Dynamics & Control	1.6	0.4	1.2	0.4	1.4	0.4	1.3	0.4	1	0.4	0.8	1.6	1.1	0.4	0.6
ChBC-74P	Process Dyn. & Control Laboratory.	1.8	1.1	1.1	1.1	1.8	2.5	0.4	0.4	1.8	0.4	1.9	1.8	1.98	1.86	2.52
ChBC-75	Process Econ.& Plant Design	1.3	1.4	1.2	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.3	1.69	1.58	0.94
ChBC-76	Biochemical Eng.	2.5	2.5	2.5	2.5	1.9	2.7	2.7	2.3	1.2	2.0	0.4	2.0	2.9	2.8	2.7
ChBC-77P	Mass Transfer Laboratory.	2.3	2.3	2.3	2.3	1.6	0.4	0.4	0.4	2.3	2.3	1	2.3	2.45	1.67	1.86
HSBE-71	Human Resource Development	0.4	0.4	2.2	0.4	0.4	1.6	1.4	1.6	1.2	1.5	1.7	0.4	1.78	0.44	0.38
MTBE-71	Operation Research	1.9	2.3	1.2	2	0.4	0.4	0.4	0.4	0.4	1.8	0.4	1.9	1.98	1.72	1.64
HSBE-72	Managerial Econ. for Engineers	0.4	0.4	2.2	1.6	1.2	1.5	1.4	1.1	1.7	1.7	1.7	0.4	1.79	0.44	0.38
ChBE-74	Computational Fluid Dynamics	1.4	1.4	1.4	1.4	1.2	0.4	0.4	0.4	0.9	0.9	0.9	1.4	1.59	1.13	1.15
ChBP-81	Project	1.9	1.1	1.1	1.1	1.8	2.5	1.1	1.1	1.9	2.6	2.7	1.9	2.04	2.49	1.86
ChBC-82	Bioresource Technology	2.7	2.7	2.7	2.5	1.9	2.7	2.7	2.2	1	1.8	0.4	2.7	2.88	2.56	2.7
ChBC-83P	Biochemical Eng. Laboratory.	2.7	2.7	2.7	2.1	1.7	1.7	1.9	1.2	0.4	0.4	0.4	2.7	2.88	2.56	2.7
ChBC-84	Model. & Simulation in Chem. Eng.	2	2	2	1.9	1.4	1.4	0.4	0.4	0.4	0.4	0.4	2	2.2	2.08	2.02
ChBC-85	Industrial Pollution Abatement	1.4	1.5	1.1	1.5	1.0	1.5	1.5	0.4	0.4	0.4	0.4	0.4	1.3	2.0	1.6
ChBE 82	Petroleum Refining	2.2	1.7	1.7	0.8	1.6	1.4	1.6	1.2	1.2	0.9	1.2	2.2	2.48	1.51	2.3
ChBE 81	Process Heat Integration	2.3	2.3	2.3	2.1	1.9	1.4	1.7	0.4	0.4	0.4	0.4	2.3	2.49	1.72	1.02
HSBE-82	Entrepreneurship Development	0.4	0.4	2.2	0.4	0.4	1.6	1.4	1.6	1.2	1.6	1.7	0.4	1.78	0.44	0.38
ChBE-82	Fuel Cell Technology	2.1	1.7	1.7	1.7	1	1.5	1.3	0.6	0.4	0.4	0.4	2.1	2.1	1.2	1.7
Overall PO Attainment		1.75	1.54	1.50	1.24	1.17	1.13	1.08	0.84	0.88	1.01	0.95	1.69	1.83	1.51	1.41

Table B.3.3.2b

For the Academic year 2017-2018

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CHM-101	Chemistry-I	1.7	1.6	1.2	0.3	0.4	0.4	0.4	0.4	0.4	1.7	0.4	1.8	1.6	1.6	0.9
PHY-101	Physics-I	2.1	2.1	1.9	1.1	1.8	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4
MTH -101	Mathematics-I	1.8	1.4	1.8	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.4	1.5	1.6	1.1
HSS 101	Communi. Skills & Oral Pres.	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	1.9	2.1	1.9	0.4	0.5	0.4	0.4
IT-101	Computer Fundamentals And Problem Solving Techniques	1.8	1.4	1.7	1.2	1.3	0.4	0.4	0.4	0.4	0.4	0.4	1.6	2.1	0.9	0.9
CIV- 102	Engineering Drawing	1.7	1.6	1.6	1.6	1.3	1.3	1.3	0.4	1.7	1.7	1.3	1.3	1.8	1.7	1.6
CHM-101 P	Chemistry-I Laboratory	2.3	1.5	1.4	0.3	2.3	1.9	2.1	0.4	0.4	1.4	1.9	1.3	2.4	2.3	1.5
PHY-102 P	Physics-I Laboratory	0.58	0.53	0.58	0.56	0.54	0.35	0.38	0.42	0.40	0.42	0.41	0.79	0.45	0.55	0.36
IT 102 P	Computer Fundamentals And Problem Solving Techniques Laboratory	1.9	2.0	2.3	1.4	2.0	0.4	0.4	0.4	0.8	0.4	0.4	2.4	1.2	2.1	1.0
WSP-I	Workshop Practices- I	2.3	1	1	0.3	1.7	1.7	1.7	1.7	2.4	1.7	0.4	2.4	1.8	1.1	1
CHM-201	Chemistry-II	1.8	1.6	1.7	1.1	1.1	1	2.1	1.1	1.1	2	0.4	1.6	1.8	2	1.2
PHY-201	Physics-II	1.5	1.4	1.2	0.8	0.7	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.5	0.4	0.4
MTH-201	Mathematics-II	1.9	1.5	1.8	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	1.5	1.9	1.1
HSS-201	Introduction To Social Sciences	0.4	0.4	0.7	0.3	0.4	1.5	1.1	1.3	1.5	0.8	0.5	0.8	0.5	0.4	0.4
CSE-201	Computer Programming	1.6	1.2	1.5	1.1	1.2	0.4	0.4	0.4	0.4	0.4	0.4	1.5	1.9	1.1	0.8
CIV-201	Strength of Materials	1.4	1.4	1	1	0.4	1.1	0.7	0.4	0.4	0.4	0.4	0.4	1.2	0.7	1
MED-201	Machine Drawing	1.2	0.4	1.2	0.7	1.7	0.4	0.4	0.8	0.7	0.4	0.4	0.7	1.5	1	0.6
CHM-201 P	Chemistry-II Laboratory	2.3	1.9	1.7	0.3	0.4	1.7	1.9	0.4	0.4	1.6	1.4	1.4	2.3	2.3	1.9
PHY-201 P	Physics-II Laboratory	0.51	0.46	0.58	0.84	1.23	0.35	0.38	0.42	0.40	0.42	0.41	0.79	0.45	0.49	0.44
CSE-202 P	Computer Programming Laboratory	1.4	1.4	1.4	1	1.4	0.4	0.4	0.4	0.6	0.4	0.4	1.6	1	1.4	0.8
WSP-II	Workshop Practices-II	2.4	1.1	1	0.3	1.7	1.7	1.8	1.8	2.5	1.8	0.4	2.5	1.9	1.1	1
ChBC-31	Introduction to Chemical Eng.	1.5	1.1	0.9	0.3	0.5	1	0.7	0.6	0.4	0.4	0.5	0.7	1.8	1.7	1.6
ChBC-32	Material and Energy Balance	2.4	2.4	1.9	1.8	2	1.6	1.6	1.6	1	0.4	1.6	2.3	2.3	1.7	1.6
ChBC-33	Process Fluid Mechanics	1.8	1.7	1.8	1.3	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.4	2	1.3	0.8
ChBC-34	Thermodynamics and Chemical Kinetics	1.8	1.4	1.2	1.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.7	1.5	1.5	1.3

EEBC-31	Basic Electrical Eng.	2.6	1.8	1.6	2.3	1.8	1.5	0.4	0.4	0.4	0.4	2.2	1.5	2.1	2	2.1
EEBC-32P	Basic Electrical Eng. Laboratory.	2.4	1.6	1.6	1.9	1.4	1.4	0.4	0.4	0.4	0.4	1.7	1.4	1.8	1.7	1.8
MTBC-31	Chemical Eng. Mathematics-I	1.6	1.7	1.7	1	1.2	0.4	0.4	0.4	0.4	0.4	0.4	1.6	1.7	1.9	0.4
ChBC-41	Chemical Eng. Thermodynamics	1.5	1.5	1.2	1.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.8	1.5	1.6	0.8
ChBC-42	Heat Transfer	1.9	1.9	1.8	1.5	0.4	1.1	1.1	0.4	0.4	0.4	0.4	1.5	1.6	2	0.9
ChBC-43	Mechanical Operations	2	1.7	1.5	1.5	0.4	1.5	1.9	0.4	0.4	0.4	0.4	1.3	2.1	1.9	1.9
ChBC-44P	Fluid Mec. & Mech.Opera. Laboratory	2.2	2.2	2.2	2.1	1.5	0.3	0.4	0.4	2.2	2.2	1	1	2.2	1.7	1.5
HSBC41	Ethics and Self Awareness	0.4	0.4	2	0.3	0.4	1.5	1.3	1.5	1.1	1.4	1.5	1.5	0.5	1.5	0.4
ChBS-41	Seminar	2.3	2.7	2.3	2.3	2.3	1.5	2.3	2.8	0.9	2	1.3	1.9	2	1	2.7
EEBC-41	Basic Electronics Eng.	2.1	1.7	2	2	1.6	0.6	0.9	0.4	0.4	0.4	0.4	1.5	2	1.7	1.5
EEBC-41P	Basic Electronics Eng. Laboratory	2.1	1.5	1.15	1.1	1.2	1.1	1.0	0.49	0.49	0.45	1.10	1.18	1.38	1.4	1.16
MTBC-41	Chemical Eng. Mathematics –II	1.7	1.5	1.1	1.1	0.4	0.4	0.4	0.4	0.4	1	0.4	1.3	1.7	1.2	1.4
ChBC-51	Process Equipment Design – I (Mechanical Aspects)	1.6	1.4	1.4	1	1.3	1.1	1.2	0.4	0.7	0.5	1.1	1.2	1.7	1.4	1.6
ChBC-52	Chemical Reaction Eng.	2.1	1.8	1.7	1.7	1.6	1.4	1.4	1.6	1.7	0.4	1.5	1.7	2.3	1.1	2.1
ChBC-53	Material Science & Technology	1.6	1.8	2	2	1.7	1.1	1.7	0.6	0.4	0.4	0.6	2.6	1.8	1.8	2.1
ChBC-54	Chemical Technology – I	1.3	1.4	1.5	1.7	1.6	1.2	1.3	0.6	0.6	0.6	0.9	2.5	1.6	1.2	1.4
ChBC-55	Mass Transfer -I	2	1.8	1.7	1.7	1.7	1.8	2	2.1	2	2.1	2.1	2.1	2.7	2	1.7
ChBS-56P	Heat Transfer Laboratory.	2.3	2	2.4	2.5	0.4	1.8	2.2	0.4	0.4	0.4	0.4	1.9	2	2.2	1.8
HSBC-51	Basic Management Principles	0.4	2.6	2.2	2.7	0.4	2.1	2.1	2.2	2.2	2.4	2.3	2.3	0.5	0.4	0.4
ChBC-61	Proc. Equip. Design -II (Process Aspect)	1.6	1.4	1.4	1	1.3	1.1	1.2	0.4	0.7	0.5	1.1	1.2	1.7	1.4	1.6
ChBC-62	Mass Transfer – II	1.5	1.6	1.5	1.2	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.8	1.4	1.5
ChBC-63	Chemical Technology – II	1.5	1.5	1.6	1.4	1.5	1.3	1.8	0.8	0.4	0.4	0.7	2.6	1.5	0.4	1.1
ChBC-64	Energy Eng.	2.4	2	2.2	2	1.8	1.7	2.2	2.4	1.5	1.9	1.7	1.7	2.4	2.1	1.6
ChBC-65P	Energy Eng. Laboratory.	1.6	1	1	0.9	1.4	1.4	2	0.4	1.4	0.4	1.5	1.5	1.3	1.5	1.4
ChBC-66	Process Instrumentation	2.4	1.7	0.9	1.7	1.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2.6	1.9	1.7
ChBC-67	Transport Phenomena	2.1	2.1	2	1.4	1.4	1.3	1.5	1.1	0.4	0.4	0.4	1.6	2.2	2.1	2
ChBC-68P	Thermodyn. & Reac. Eng. Laboratory.	2.7	2.7	2.7	2	1.6	1.7	1.9	1.2	0.4	0.4	0.4	2	2.9	2.7	2.7
ChBC-69	Ind. Training & Presentations	2.5	2.5	2.1	1.5	1.5	1.1	0.8	1.2	1.2	2	1.4	2	2.3	2.1	1.9

ChBP-71	Pre-project work	1.7	1	1	1	1.6	2.3	1	1.1	1.7	2.3	2.3	1.7	1.8	2.2	1.6
ChBC-72	Chemical Process Safety	2.4	2.3	2	2.1	1.6	1.8	2.4	2.1	1.8	2	2	2.3	2.4	1.9	1.4
ChBC-73	Process Dynamics & Control	2.6	2.2	2.4	2.2	1.7	1.9	1.9	1.1	0.4	0.4	0.4	1.9	2.8	1.1	2.2
ChBC-74P	Process Dynamics & Control Laboratory	2.6	2.6	2.6	1.8	1.5	2.4	2.6	1.9	1.2	1.9	0.4	1.9	2.8	2.5	2.6
ChBC-75	Process Econ. & Plant Design	1.4	1.5	1.3	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.5	1.8	1.7	1
ChBC-76	Biochemical Eng.	2.5	2.46	2.44	2.45	1.87	2.65	2.7	2.32	1.16	1.96	0.41	1.96	2.8	2.7	2.6
ChBC-77P	Mass Transfer Laboratory.	2.2	2.2	2.2	2.1	1.5	0.3	0.4	0.4	2.2	2.2	1	1	2.2	1.7	1.5
MTBE-71	Operation Research	2.6	2.2	2.4	2.2	1.7	1.9	1.9	1.1	0.4	0.4	0.4	1.9	2.8	1.1	2.2
HSBE-72	Managerial Econ. for Engineers	0.4	0.4	2.2	1.6	1.2	1.5	1.4	1.1	1.6	1.7	1.6	1.7	1.8	0.4	0.4
ChBP-81	Project	1.7	1	1	1	1.6	2.3	1	1.1	1.7	2.3	2.3	1.7	1.8	2.2	1.6
ChBC-82	Bioresource Technology	2.7	2.6	2.6	2.4	1.9	2.6	2.6	2.1	1	1.7	0.4	1.8	2.6	2.5	2.6
ChBC-83P	Biochemical Eng. Laboratory.	2.2	2	1.7	1.5	1.9	1.4	1.3	1.1	1	1.2	1.4	1.6	1.7	1.7	1.8
ChBC-84	Modeling & Sim. in Chem. Eng.	2	2	2	1.6	1.2	1.2	0.4	0.4	0.4	0.4	0.4	1.5	2.2	2	2
ChBC-85	Industrial Pollution Abatement	2.0	2.4	1.8	2.3	1.5	2.3	2.4	0.4	0.4	0.4	0.4	0.4	2.5	2.4	2.3
ChBE-82	Petroleum Refining	2.3	1.8	1.8	0.3	1.4	1.6	1.5	1.7	0.4	0.4	0.8	1.7	2.5	1.6	2.3
HSBE-82	Entrepreneurship Development	0.4	0.4	2.2	0.3	0.4	1.6	1.4	1.6	1.2	1.6	1.6	1.7	1.8	0.4	0.4
Overall PO Attainment		1.81	1.62	1.64	1.31	1.22	1.18	1.18	0.88	0.87	0.96	0.89	1.49	1.80	1.52	1.39

Table B.3.3.2c

OVERALL PO/PSO ATTAINMENT LEVELS

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
2019-2020	1.90	1.74	1.69	1.41	1.15	1.23	1.19	0.90	0.98	1.06	1.10	1.47	1.74	1.61	1.56
2018-2019	1.75	1.54	1.50	1.24	1.17	1.13	1.08	0.84	0.88	1.01	0.95	1.69	1.83	1.51	1.41
2017-2018	1.81	1.62	1.64	1.31	1.22	1.18	1.18	0.88	0.87	0.96	0.89	1.49	1.80	1.52	1.39

Table B.3.3.2.d

CRITERION 4	**Students' Performance**	**100**
	Marks Claimed	**69**

Item	CAY	CAYm1	CAYm2
Sanctioned intake in the program (N)	103	92	79
Total no of admitted students in the first year minus no of students migrated to the other programs/ institutions, plus no of students migrated in the program (N1)	92	73	69
No of students admitted in the 2nd year in the same batch via lateral entry (N2)	NIL	NIL	NIL
Separate division students, if applicable (N3)	NIL	NIL	NIL
Total no of students admitted in the program (N1+N2+N3)	92	73	69

Table B.4a

CAY – Current Academic Year (2020-2021)
CAYm1 - Current Academic Year minus1 (2019-2020)
CAYm2 - Current Academic Year minus2 (2018-2019)
CAYm3 - Current Academic Year minus3 (2017-2018)
LYG - Last Year Graduate (2016-2017)
LYGm1 - Last Year Graduate minus1 (2015-2016)
LYGm2 - Last Year Graduate minus2 (2014-2015)

Year of Entry	N1+N2+N3 (As defined above)	Number of students who have successfully graduated without backlogs in any semester/ year of study. (Without backlog means no compartment or failures in any semester/ year of study)			
		1 year	II year	III year	IV year
CAY	92				
CAYm1	73	31			
CAYm2	69	20	20		
CAYm3	57	17	10	10	
LYG	34	21	17	16	16
LYGm1	60	31	28	28	26
LYGm2	65	49	46	43	39

Table B.4b

Year of entry	N1+N2+N3 (As defined above)	Number of students who have successfully graduated [With backlog + without Backlog]			
		1 year	II year	III year	IV year
CAY	92				
CAYm1	73	70			
CAYm2	69	69	69		
CAYm3	57	54	54	53	
LYG	34	34	34	34	34
LYGm1	60	59	59	59	59
LYGm2	65	62	62	62	62

Table B.4c

4.1 Enrolment Ratio (20)

Claimed 18

Enrolment Ratio = N1/ N

Item **(Students enrolled at the First Year Level on average basis during the period of assessment)**	**Marks**
>=90% students enrolled	20
>=80% students enrolled	18
>=70% students enrolled	16
>=60% students enrolled	14
Otherwise	0

	N (from first table)	**N1 (from first table)**	**Enrolment Ratio = (N1 / N)**
2020 - 2021	103	92	0.89
2019 - 2020	92	73	0.79
2018 - 2019	79	69	0.87
		Average	0.85

4.2 Success Rate in the stipulated period in the program (20)

Claimed 12.35

4.2.1 Success rate without backlogs in any semester/ year of study (15)

Claimed 7.5

SI = (Number of students who have graduated from the program without backlog)/ (Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = mean of success index (SI) for past three batches

Success rate without backlogs in any semester = 15×mean of success index (SI) for past three batches

SI = (No of students who graduated in the program in stipulated period of course duration) / (No of students admitted in the first year of that batch and admitted in 2nd year via lateral entry)

Items	**LYG**	**LYGm1**	**LYGm2**
No of students admitted in the corresponding 1st year + admitted 2nd year via lateral entry and separate division , if applicable	34	60	65

No of students who have graduated without backlogs in the stipulated period	16	26	39
Success Index(SI)	0.47	0.43	0.60

Table B.4.2.1

Average SI = 0.50
Success rate = 15× 0.50= **7.5**

4.2.2 Success rate with backlogs in stipulated period of study (5) **Claimed 4.85**

SI = (Number of students who have graduated from the program in the stipulated period of course duration)/(Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)
Average SI = mean of success index (SI) for past three batches

Success rate = 5×mean of success index (SI) for past three batches

Items	**LYG**	**LYGm1**	**LYGm2**
No of students admitted in the corresponding 1st year + admitted 2nd year via lateral entry and separate division , if applicable	34	60	65
No of students who have graduated with backlogs in the stipulated period	34	59	62
Success Index(SI)	1.00	0.98	0.95

Table B.4.2.2

Average SI = 0.97
Success rate = 5× 0.97= **4.85**

4.3 Academic Performance in Second Year (10) **Claimed 6.05**

Academic performance = Average API (Academic Performance Index)
Where API =((Mean of second year grade point average of all successful students on a 10 points scale) or (Mean of the percentage of marks of all successful student in second year/10))*(no of successful students/ no of students appeared in the examination))
Successful students are those who are permitted to proceed to the third year:

Academic performance	**CAYm1**	**CAYm2**	**CAYm3**
Mean of SGPA or percentage of all successful students(X)	7.12	7.14	7.54

Total no of successful students(Y)	66	44	25
Total no of students appeared in the examination(Z)	69	54	34
API = X*(Y/Z)	6.81	5.81	5.54
Average API = (AP1+AP2+AP3)/3	6.05		

Table B.4.3

4.4 Placement and Higher Studies, Entrepreneurship (30)

Claimed 12.6

Assessment Points = 30×Average placement

Items	LYG	LYGm1	LYGm2
Total no of final year students(N)	34	59	62
Students placed in companies/ Government Sector (X)	10	19	18
Students admitted in higher studies with valid qualifying scores (GATE/ equivalent State/ National Level Tests, GRE, GMAT etc.) (Y)	5	6	8
Students turned entrepreneur in engg/tech(Z)	0	0	0
Total = (X+Y+Z)	15	25	26
Placement Index =(X+Y+Z)/ N	0.44	0.42	0.41
Average Assessment Points (P1+P2+P3)/3	0.42		

Table B.4.4

4.5 PROFESSIONAL ACTIVITIES (20)

Claimed 20

4.5.1 Professional societies / chapters and organizing engineering events (5)

Claimed 5

(Instruction: The institution may provide data for past three years).

2017-18	• One week workshop "Connecting people to nature • One week STC on "Process Control" • One day national conference on "Recent innovations in science, technology and engineering at NIT Srinagar.
2018-19	• Student chapter, IIChE

4.5.2 Publication of technical magazines, newsletters, etc. (5)

Claimed 5

1. Malik parvez Ahmed, Naveed Ahsan Bhat, Dawood Rasid, Divyanshu Gupta, Kunal Sopori, Effect on heat transfer by using nanofluids comprising Al2O3 and CuO, 3rd international conference on RTAET at Mata Vashno Devi University, Katra, J&K, India (25-26 October 2018).
2. Malik parvez Ahmed, Aqib Ashraf, Aamir Suhail Khatana, Hindaal Mustafa, Modification of CO2 Capture Techniques by Carbon Nanotubes: A Review, Journal of Energy Research and Environmental Technology, Volume 5, Issue 3, pp 86-88, 2018.

4.5.3 Participation in inter-institute events by students of the program of study (10)

Claimed 10

2017-18	• Participation in state universities championship of Cricket, football and basketball tournament at Jammu University • Participation in inter institute tri series of T20 Cricket and Basketball tournament at SSM College, Srinagar. • Inter institute tri series of T20 cricket tournament with Dental College Srinagar at NIT Srinagar.
2018-19	• Participation in Inter NIT basketball tournament at NIT Trichy • Participation in Inter NIT Kabbadi tournament at NIT Surthakal. • Participation in State University championship of cricket football, badminton and Table Tennis at Jammu University • Participation in Inter NIT Badminton and Basketball tournament at NIT Warangal. • Participation in Open Hockey tournament at Baramulla Kashmir • Participation in Inter NIT Weight Lifting" Power Lifting" Best Physique and Swimming tournament at NIT Surathkal.

CRITERION 5	Faculty Information and Contributions	200
	Marks Claimed	147.36

Name of the Faculty Member	Qualification			Association with the Institution	Designation	Date on which Designated as Professor/ Associate Professor	Date of Joining the Institution	Department	Specialization	Academic Research			Currently Associated (Y/N) Date of Leaving (In case Currently Associated is ("No"	Nature of Association (Regular/Contract)
	Degree (highest degree)	University	Year of attaining higher qualification							Research Paper Publications	Ph.D. Guidance	Faculty Receiving Ph.D. during the Assessment Years		
Dr. Mohd. Noor Salam Khan	Ph.D	IIT Roorkee	2005	Permanent	Professor	8-09-2013	16-05-1989	Chemical	Biochemical	08	04	No	Y	Regular
Dr. Fasil Qayoom Mir	Ph.D	IIT Delhi	2015	Permanent	Associate Professor	9-10-2018	8-03-2002	Chemical	Membrane Science	11	02	No	Y	Regular
Dr. Mushtaq Ahmad Rather	Ph.D	NIT Srinagar	2017	Permanent	Associate Professor	9-10-2018	30-12-2006	Chemical	Energy, Environment	33	05	Yes	Y	Regular
Dr. Tanveer Rasool Dar	Ph.D	NIT Srinagar	2018	Permanent	Asstt. Professor	-	8-03-2002	Chemical	Biomass conversion	12	05	Yes	Y	Regular
Dr. Malik Parvez Ahmad	Ph.D	NIT Srinagar	2018	Permanent	Asstt. Professor	-	30-12-2006	Chemical	CFD	16	03	Yes	Y	Regular
Dr. B. Krishna Srihari	Ph.D	IGCAR	2016	Permanent	Asstt. Professor	-	05-11-2018	Chemical	Micro Channels & CFD	03	0	No	Y	Regular
Dr. Kurella Swamy	Ph.D	IIT Kharagpur	2017	Permanent	Asstt. Professor	-	31-10-2018	Chemical	Industrial Pollution Control	08	01	No	Y	Regular
Dr. Shashikant Kumar	Ph.D	(ISM) Dhanbad	2016	Permanent	Asstt. Professor	-	18-10-2018	Chemical	Membrane Science	01	01	No	Y	Regular
Dr. Fatima Jalid	Ph.D	NIT Srinagar	2020	Permanent	Asstt. Professor	-	08-01-2016	Chemical	Catalysis	09	0	Yes	Y	Regular
Dr.Leela Manohar Aeshala	Ph.D	IIT Guwahati	2014	Permanent	Asstt. Professor	-	15-03-2021	Chemical	Electrochemical synthesis	11	0	No	Y	Regular
Dr.Asma Iqbal	Ph.D	AMU	2019	Permanent	Asstt. Professor	-	15-03-2021	Chemical	Distillation, Modelling & Simulation	14	0	No	Y	Regular
Dr.Brajesh Kumar	Ph.D	IIT Roorkee	2018	Permanent	Asstt. Professor	-	15-03-2021	Chemical	Thermodynamic Analysis, Modelling & Simulation	11	0	No	Y	Regular

Dr.Mohammad Farooq Lala	Ph.D		2002	Permanent	Professor		18-03-1982	Humanities	Marketing & Finance	03	02	No	N	Regular
Dr. Tanveer Jalal	Ph.D	AMU	1993	Permanent	Professor		3-7-1998	Mathematics	Sequence spaces	21	01	No	Y	Regular
Dr. Zamrooda Jabeen	Ph.D	University of Kashmir	2007	Permanent	Associate Professor		6-03-1996	Mathematics	Operations Research	14	01	-	Y	Regular
Mr. Mohammad Asif	M.Tech	AMU	2013	Contractual	Contractual faculty	-	12-08-2015	Chemical	Process Modelling & Simulation	-	-	No	N	Contract
Mr. Mohd. Imran	M.Tech	IIT Roorkee	2014	Contractual	Contractual faculty	-	07-08-2015	Chemical	Industrial Pollution Abatement	-	-	No	N	Contract
Mr. Aash Mohammad	M.Tech	IIT Roorkee	2014	Contractual	Contractual faculty	-	17-08-2015	Chemical	Industrial Pollution Abatement	-	-	No	N	Contract
Mr. Ram Singh	M.Tech	IIT Roorkee	2013	Contractual	Contractual faculty	-	07-08-2015	Chemical	Chemical Engg.	-	-	No	N	Contract
Mr. Tejbir Singh	M.Tech	IIT Roorkee	2014	Contractual	Contractual faculty	-	08-09-2015	Chemical	Chemical Engg.	-	-	No	N	Contract
Mr. Rupak Kumar Singh	M.Tech	IIT-BHU	2013	Contractual	Contractual faculty	-	07-09-2015	Chemical	Microfluidic fuel cells	-	-	No	N	Contract
Miss Parul Singh	M.Tech	AMU	2014	Contractual	Contractual faculty	-	16-03-2016	Chemical	Petroleum Technology	-	-	No	N	Contract
Mr. Mohammad Umair Iqbal	M.Tech	IIT Gandhinagar	2016	Contractual	Contractual faculty	-	19-12-2016	Chemical	Process Safety	-	-	No	N	Contract
Mr. Nasir Ahmed	M.Tech	NIT Jalandhar	2016	Contractual	Contractual faculty	-	17-12-2016	Chemical	Membrane science	-	-	No	N	Contract
Miss Iqra	M.Tech	NIT Srinagar	2017	Contractual	Contractual faculty	-	05-09-2017	Chemical	Membrane science	-	-	No	N	Contract
Dr. Iqra Akbar	Ph.D	IIUM Malaysia	2019	Contractual	Contractual faculty	-	05-09-2017	Chemical	Nanotechnology	03	-	No	N	Contract
Dr. Afkham Mir	Ph.D	NIT Jalandhar	2018	Contractual	Contractual faculty	-	05-03-2018	Chemical	Graphene, 2D materials	04	-	No	N	Contract
Dr. Saptak Rarotra	Ph.D	IIT Guwahati	2018	Contractual	Contractual faculty	-	05-03-2018	Chemical	Micro & Nanotechnology	-	-	No	N	Contract
Dr. Sameena Naaz Malik	Ph.D	IIT Mumbai	2019	Contractual	Contractual faculty	-	18-03-2019	Chemical	Waste Water Treatment	06	-	No	N	Contract

Table B.5

5.1. Student-Faculty Ratio (SFR) (20)

Claimed 14

(To be calculated at Department Level)
No. of UG Programs in the Department (n):**01**
No. of PG Programs in the Department (m):**01**
No. of Students in UG 2nd Year=**u1**
No. of Students in UG 3rd Year= **u2**
No. of Students in UG 4th Year= **u3**
No. of Students in PG 1st Year= **p1**
No. of Students in PG 2nd Year=**p2**

No. of Students = Sanctioned Intake + Actual admitted lateral entry students

(The above data to be provided considering all the UG and PG programs of the department)
***S**=Number of Students in the Department = UG1+UG2+UG3+PG1+PG2*
***F** = Total Number of Faculty Members in the Department (excluding first year faculty)*

Student Faculty Ratio (SFR) = S / F

Year	**CAY (2020-21)**	**CAYm1 (2019-20)**	**CAYm2 (2018-19)**
u1.1	103	92	79
u1.2	92	79	77
u1.3	79	77	77
UG1	**274**	**248**	**233**
p1.1	22	22	18
p1.2	22	18	18
PG1	**44**	**40**	**36**
Total No. of Students in the Department **(S)**	**318**	**288**	**269**
No. of Faculty in the Department **(F)**	**14**	**14**	**16**
Student Faculty Ratio (SFR)	**22.71**	**20.57**	**16.81**
Average SFR	**20.03**		

Table B.5.1

Assessment	**14**

Marks to be given proportionally from a maximum of 20 to a minimum of 10 for average SFR between 15:1 to 25:1, and zero for average SFR higher than 25:1. Marks distribution is given as below:

= 15 - 20 Marks
< = 17 - 18 Marks
< = 19 - 16 Marks
< = 21 - 14 Marks< = 23 - 12 Marks

< = 25 - 10 Marks
> 25.0 - 0 Marks
Note:
Minimum 75% should be Regular/ full time faculty and the remaining shall be Contractual Faculty/Adjunct Faculty/Resource persons from industry as per AICTE norms and standards. The contractual Faculty will be considered for assessment only if a faculty is drawing a salary as prescribed by the concerned State Government for the contractual faculty in the respective cadre and who have taught over consecutive 4 semesters.

5.1.1. Provide the information about the regular and contractual faculty as per the format mentioned below:

	Total number of regular faculty in the department	**Total number of contractual faculty in the department**
CAY (2020-21)	14	03
CAYm1 (2019-20)	11	03
CAYm2 (2018-19)	12	05

Table 5.1.1

5.2. Faculty Cadre Proportion (20)

Claimed 20

The reference Faculty cadre proportion is 1(F1):2(F2):6(F3)

F1: Number of Professors required = 1/9 x Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

F2: Number of Associate Professors required = 2/9 x Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

F3: Number of Assistant Professors required = 6/9 x Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

Year	**Professors**		**Associate Professors**		**Assistant Professors**	
	Required F1	Available	Required F2	Available	Required F3	Available
CAY (2020-21)	1.77	2	3.54	3	10.62	8
CAYm1 (2019-20)	1.6	1	3.2	4	9.6	9
CAY*m*2 (2018-19)	1.49	2	2.98	4	8.94	10
Average Numbers	RF1=1.62	AF1=1.66	RF2=3.24	AF2=3.67	RF3=9.72	AF3=9

Table B.5.2

Cadre Ratio marks = $\left[\left(\frac{AF1}{RF1}\right)+\left(\frac{AF2}{RF2}\times 0.6\right)+\left(\frac{AF3}{RF3}\times 0.4\right)\right]\times 10$ = 20 (**limited to 20)**

- If AF1 = AF2= 0 then zero marks
- Maximum marks to be limited if it exceeds 20

Example: Intake = 180; Required number of Faculty: 12; RF1= 1, RF2=2 and RF3=9
Case 1: AF1/RF1= 1; AF2/RF2 = 1; AF3/RF3 = 1; Cadre proportion marks = (1+0.6+0.4) x10

= 20
Case 2: AF1/RF1= 1; AF2/RF2 = 3/2; AF3/RF3 = 8/9; Cadre proportion marks = (1+0.9+0.3) x 10 = limited to 20
Case 3:AF1/RF1=0; AF2/RF2=1/2; AF3/RF3=11/9; Cadre proportion marks = (0+0.3+0.49) x 10 = 7.9

5.3. Faculty Qualification (20)

Claimed 14.70

FQ =2.0 x [(10X +4Y)/F)] where x is no. of regular faculty with Ph.D., Y is no. of regular faculty with M. Tech., F is no. of regular faculty required to comply 20:1 Faculty Student ratio (no. of faculty and no. of students required are to be calculated as per 5.1)

	X	**Y**	**F**	**FQ=2.0 x [(10X +4Y)/F)]**
CAY (2020-21)	11	0	15.9	13.84
CAYm1 (2019-20)	10	0	14.4	13.89
CAY*m*2 (2018-19)	11	0	13.45	16.36
Average Assessment				**14.7**

Table B.5.3

5.4 Faculty Retention (10)

Claimed 10

No. of regular faculty members in CAYm1=10 CAY = 11

Item (% of faculty retained during the period of assessment keeping CAYm2 as base year)	**Marks**
>=90% of required Faculty members retained during the period of three academic years keeping CAY*m*2 as base year	10
>=75% of required Faculty members retained during the period of three academic years keeping CAY*m*2 as base year	08
>=60% of required Faculty members retained during the period of three academic years keeping CAY*m*2 as base year	06
>=50% of required Faculty members retained during the period of three academic years keeping CAY*m*2 as base year	04
<50% of required Faculty members retained during the period of three academic years keeping CAY*m*2 as base year	0

Table B.5.4

FACULTY RETENTION			
DESCRIPTION	**CAY (2020-21)**	**CAYm1 (2019-20)**	**CAYm2 (2018-19)**
No of Faculty Retained	14	14	16
Required Faculty	15.9	14.4	13.45
% Of Faculty Retained	88.05	97.2	118.9
AVERAGE ASSESSMENT			**101.4**

Assessment	**10**

5.5 Faculty competencies in correlation to Program Specific Criteria (10) **Claimed 10**

Faculty members of Chemical Engineering Department are specialized in diversified areas of Chemical Engineering. They have good research exposure and have published research papers in journals of repute (American Chemical Society (ACS), Springer, Elsevier, Taylor and Francis, etc.) and presented several papers in national and international conferences in India as well as abroad. Faculty has got the provision for going for higher studies sponsored by the Institute under QIP. The faculty members participate in FDPs, STCs, and Workshops to upgrade their knowledge in latest field of research. Faculty is involved in developing working models for laboratories for the effective teaching-learning process. Faculty members are also actively involved in conducting events such as STCs and Workshops. Faculty shows keen interest in developing central library facility by recommending latest books for the benefit of students and faculty. Faculty members also take keen interest in developing research facilities for the benefit of B.Tech., M.Tech. and Ph.D students. The Department of Chemical Engineering has faculty expertise available in the domains of Transport Processes, Biochemical Engineering, Membrane science & Engineering, Energy & Environment, Modeling and Simulation, CFD, Catalysis, Nanotechnology, Mathematics, Electrical Technology, Electronics and Management, etc. The Faculty in each domain and their research areas are given below:

Name of Faculty	Qualification	Area of Specialization/ Research Area
Dr. Mohd. Noor Salam Khan	Ph.D (Chemical Engineering)	Fermentation, Bioseparation, Modeling and Simulation, Energy from Biomass and Pollution Abatement.
Dr. Fasil Qayoom Mir	Ph.D (Chemical Engineering)	Membranes, Electrochemical systems, Electrodialysis, Fuel cells, Heat Transfer and Fluid Mechanics.
Dr. Mushtaq Ahmad Rather	Ph.D (Chemical Engineering)	Energy, Environment, Nanotechnology, Waste water Treatment, Biomass Conversion, Photo-catalysis, Biofuels.
Dr. Tanveer Rasool Dar	Ph.D (Chemical Engineering)	Biomass conversion Technology, Industrial Pollution Abatement, Modeling and Simulation, Material Science & Technology, Environment Technology.
Dr. Malik Parvez Ahmad	Ph.D (Chemical Engineering)	CFD, Heat and Mass Transfer, Fluid flow, nanotechnology, Multiphase flow.
Dr. B. Krishna Srihari	Ph.D (Chemical Engineering)	Micro Channels, Liquid-Liquid Slug Flow, Fluid Mechanics, Carbon dioxide reduction, CFD, Microfluidics, Waste Water Treatment, Solid Waste Management, Heat, Mass and Fluid Flow Simulations using COMSOL Multiphysics.
Dr. Kurella Swamy	Ph.D (Chemical Engineering)	Industrial Pollution Control, Phase Transfer Catalysis, Coal Gasification, Separation and Purification Processes.
Dr. Shashikant Kumar	Ph.D (Chemical Engineering)	Membrane Separation, Waste water treatment.
Dr. Mohammad Farooq Lala	Ph.D (Humanities & Social Sciences)	Marketing & Finance
Dr. Tanveer Jalal	Ph.D (Mathematics)	Sequence spaces, Summability theory
Dr. Zamrooda Jabeen	Ph.D (Mathematics)	Operations Research.
Dr. Fatima Jalid	B.Tech (Chemical Engineering) Registered for Ph.D at IIT Delhi	Computational Catalysis, Microkinetic Modelling, Heterogeneous Catalysis, Electrodialysis.

Dr.Leela Manohar Aeshala	Ph.D (Chemical Engineering)	Electrochemical Reduction of Carbon Dioixde, Solid Polymer Electrolyte.
Dr.Asma Iqbal	Ph.D (Chemical Engineering)	Distillation based separation processes, Conceptual process flowsheet design, Modeling and Simulation
Dr.Brajesh Kumar	Ph.D (Chemical Engineering)	Thermodynamic Analysis, Chemical Reaction Engineering, Renewable Energy, Modeling And Simulation.
Dr. Iqra Akbar	Ph.D (Bio-Chemical Engineering)	Nanotechnology, Environmental Engineering, Pharmaceuticals, Nutraceuticals
Dr. Afkham Mir	Ph.D(Chemical Engineering)	Synthesis and applications of 2D materials (graphene) • Advanced functional energy materials (membranes) • Energy storage devices (graphene supercapacitors, FETs).
Dr. Sameena Naaz Malik	Ph.D (Chemical Engineering)	Waste Water Treatment.

Assessment	**10**

5.6 Innovations by the Faculty in Teaching and Learning (10)

Claimed 10

Instructional materials

Each classroom is equipped with overhead projectors and some are equipped with the state-of-the-art smart boards. Study material prepared by teachers using standard text books and reference books are used for instruction of the students. Other instruction tools are whiteboard, charts and diagrams and laboratory demonstration models.

Working models/charts/monograms:

Apart from the test rigs and experimental set-ups, the labs of the Chemical Engineering Department are equipped with different high end equipment such as CHNS analyzer, Capillary Flow Porometer, Potentiostat, HPLC, FTIR, BET analyzer, Spectrophotometers, Bioreactor, Digital Bomb Calorimeter and working models for the effective teaching-learning process.

Assessment	**10**

5.7 Faculty as participants in faculty development/training activities/STTPs (15)

Claimed 8.66

- A Faculty scores maximum five points for participation
- Participation in 2 to 5 days Faculty/faculty development program: 3 Points
- Participation>5 days Faculty/faculty development program:5 points

Name of the Faculty	Max. 5 per Faculty		
	CAY*m*1 (2019-20)	**CAYm2 (2018-19)**	**CAYm3 (2017-18)**
Dr. Mohd. Noor Salam Khan	-	-	3
Dr. Fasil Qayoom Mir	-	5	3
Dr. Mushtaq Ahmad Rather	-	3	5
Dr. Tanveer Rasool Dar	-	3	5
Dr. Malik Parvez Ahmad	-	-	5
Dr. B. Krishna Srihari	-	5	-
Dr. Kurella Swamy	-	5	-
Dr. Shashikant Kumar	-	5	-
Miss Fatima Jalid	-	3	5
Dr. Mohammad Farooq Lala	-	-	-
Dr. Tanveer Jalal	-	3	-
Dr. Zamrooda Jabeen	-	-	-
Sum	**-**	**32**	**26**
***RF*= Number of Faculty required to comply with 20:1 Student-Faculty ratio as per 5.1**	14.4	13.45	13.35
Assessment = 3 × (Sum/0.5RF) (Marks limited to 15)	-	14.29	11.69
Average assessment over three years (Marks limited to 15) =			**8.66**

Table B.5.7

5.8 Research and Development (75)

Claimed 40

5.8.1 Academic research (20)

Claimed 20

Pub: No. of research publications in refereed/SCI Journals, Conferences, Books, Book Chapters, etc.

PhD: No. of Ph. D. Scholars registered/ awarded

Name of the Faculty	CAY (2020-2021)		CAYm1 (2019-20)		CAYm2 (2018-19)	
	Pub	**PhD**	**Pub**	**PhD**	**Pub**	**PhD**
Dr. Mohd. Noor Salam Khan	01	1-Awarded 02-Total Reg.	0	0-Awarded 03-Total Reg.	02	0-Awarded 04-Total Reg.
Dr. Fasil Qayoom Mir	03	1-Awarded 02-Total Reg.	2	0-Awarded 02-Total Reg.	07	0-Awarded 02-Total Reg.
Dr. Mushtaq Ahmad Rather	06	0-Awarded 05-Total Reg.	0	0-Awarded 05-Total Reg.	17	0-Awarded 03-Total Reg.
Dr. Tanveer Rasool Dar	01	0-Awarded 05-Total Reg.	0	0-Awarded 05-Total Reg.	06	0-Awarded 0-Total Reg.
Dr. Malik Parvez Ahmad	0	0-Awarded 3-Total Reg.	0	0-Awarded 2-Total Reg.	11	0-Awarded 0-Total Reg.
Miss Fatima Jalid	03	0-Awarded 0-Total Reg.	01	0-Awarded 0-Total Reg.	04	0-Awarded 0-Total Reg.
Dr. B. Krishna Srihari	01	0-Awarded 0-Total Reg.	01	0-Awarded 0-Total Reg.	01	-

Dr. Kurella Swamy	01	0-Awarded 1-Total Reg.	0	0-Awarded 0-Total Reg.	0	-
Dr. Shashikant Kumar	0	0-Awarded 01-Total Reg.	0	0-Awarded 01-Total Reg.	0	0-Awarded 01-Total Reg.
Dr.Leela Manohar Aeshala	01	0-Awarded 0-Total Reg.	0	0-Awarded 0-Total Reg.	0	0-Awarded 0-Total Reg.
Dr.Asma Iqbal	07	0-Awarded 0-Total Reg.	03	0-Awarded 0-Total Reg.	03	0-Awarded 0-Total Reg.
Dr.Brajesh Kumar	0	0-Awarded 0-Total Reg.	0	0-Awarded 0-Total Reg.	01	0-Awarded 0-Total Reg.
Dr. Mohammad Farooq Lala	0	- -	0	- -	-	- -
Dr. Tanveer Jalaal	03	0-Awarded 01-Total Reg.	03	0-Awarded 0-Total Reg.	6	1-Awarded 0-Total Reg.
Dr. Zamrooda Jabeen	0	0-Awarded 2-Total Reg	01	0-Awarded 0-Total Reg.	01	-
Dr. Afkham Mir	0	0-Awarded 0-Total Reg.	0	0-Awarded 0-Total Reg.	03	
Dr. Iqra Akbar	0	0-Awarded 0-Total Reg.	0	0-Awarded 0-Total Reg.	-	- -
Dr. Sameena Naaz Malik	-	- -	-	- -	04	
Assessment						**20**

5.8.2 Sponsored research (20)

Claimed 05

Funded research from outside:
(Provide a list with Project Title, Funding Agency, Amount and Duration)
Funding Amount (Cumulative during last three academic years starting from CAYm1):
Amount > 50 Lacs– 20 Marks,
Amount > 40 and ≤50 Lacs – 15 Marks,
Amount > 30 and ≤40 Lacs– 10 Marks,
Amount ≥15 and ≤30 Lacs – 5 Marks,
Amount < 15 Lacs – 0 Marks

S.No	Name	Agency	Amount
1.	Briqueting of Dal Lake weeds to serve as a fuel source.	MHRD-Swachtta Action plan	24.94 lakhs
	Assessment		**05**

5.8.3 Development activities (15)

Claimed 15

Provide details:

5.8.3.1 Product Development
5.8.3.2 Research laboratories
5.8.3.3 Instructional materials
5.8.3.4 Working models/charts/monograms etc.

5.8.3.1 In house product development:

S.No	Name of product
1.	Development of microfiltration test cell.
2.	Development of manual press for compression.
3.	Fabrication of die for ceramic membrane preparation.
4.	Fabrication and development of Electrodialysis cell.
5.	Development of various types of membranes for different industrial applications.
6.	Design and fabrication of packed column in order to determine flow characteristics and pressure drop in non-newtonian fluid through different packings.
7.	Design and fabrication of VLE still for generation of equilibrium data.
8.	Design and fabrication of helical coil heat exchanger for heat transfer enhancement using nano fluid.
9.	Fabrication of experimental setup to carry out photocatalysis involving UV light employing UV LED's than traditional UV tube.

5.8.3.2 Research laboratories

S.No.	Name
1.	Energy Engineering Lab.
2.	Environmental Engineering Lab.
3.	Catalysis Lab.
4.	Biochemical Engineering Lab.
5.	Membrane Science & Technology Lab.
6.	Multiphase Engineering Lab.

5.8.3.3 Instructional materials

Each high-end equipment in every research lab is supported with instruction manuals and operating software for proper and safe use. The instruction material also provides procedure for calibrating and troubleshooting of the equipment.

5.8.3.4 Working models/charts/monograms etc.

Apart from different high-end equipment such as CHNS analyzer, Capillary Flow Porometer, Potentiostat, BET analyzer, HPLC, FTIR, Spectrophotometers, Bioreactor, Digital Bomb Calorimeter working models like Electrodialysis cell, Microfiltration cell, distillation still, packed columns etc. are available in the department for the effective teaching-learning process.

Assessment	15

5.8.4 Consultancy (from Industry) (20)

Claimed 0

(Provide a list with Project Title, Funding Agency, Amount and Duration)
Funding Amount (Cumulative during last three academic years starting from CAYm1):
Amount >10 Lacs – 20 Marks,
Amount $\leq$10 and $\geq$ 8 Lacs – 15 Marks,
Amount < 8 and $\geq$6 Lacs– 10 Marks,

Amount < 6 and ≥4 Lacs–5 Marks,
Amount < 4 and ≥2 Lacs– 2 Marks,
Amount <2 Lacs – 0 Marks

S.No	Name	Amount
01.	M/S Green Energy	11,100/-
02.	M/S NCC Ltd. AIIMS Awantipora	17,500/-

5.9 Faculty Performance Appraisal and Development System (FPADS) (10) **Claimed 10**

The institute has in place a continuous, incisive, well-organized, and effective faculty performance appraisal system for the faculty members. For this purpose, an "Annual Assessment Report for the Faculty and the Staff" is prepared for every member. This report gives a detailed description of the members' contribution to teaching-learning process, contribution in laboratory development, course development and development of teaching aids, laboratory manuals, and special lectures. In addition, participation in of organizing seminars, symposia, conferences, continuing education programs, research and development activities, sponsored research projects, contribution to department and institute administration, etc., are also taken into account. A copy of the Assessment form is provided in the Annexure-A. The annual assessment report is given due consideration in the process of promotion and up-gradation of faculty members and hence plays a vital role in the development of the academic, research and administrative system of the institute.

Assessment	**10**

5.10 Visiting/Adjunct/Emeritus Faculty etc. (10) **Claimed 10**

Adjunct faculty also includes Industry experts. Provide details of participation and contributions in teaching and learning and /or research by visiting/adjunct/Emeritus faculty etc. for all the assessment years:

5.10.1 Provision of visiting/adjunct faculty (1)

5.10.2 Minimum 50 hours per year interaction with adjunct faculty from industry/retired professors etc. (9)

(Minimum 50 hours' interaction in a year will result in 3 marks for that year; 3marks x 3years= 9 marks)

2017-2018

Sl. No.	Date	Name of Event	Delivered By
01	Sep 6-7, 2017	"Youth Entrepreneurship in conflict areas" Symposium in Srinagar, J&K	CHINAR International in association with South Asia Network of Impact Masters and IIED Center, NIT Srinagar
02	Oct 2, 2017 (MEGA EVENT)	IDEA CHALLENGE 2017 – "The Future World"	IIED Center
03	Oct 2, 2017	Swach Bharat Abhiyan	Srinagar Municipal Corporation
04	Oct 2, 2017	Orientation Session of Batch 2016 & Batch 2017	IIED Center
05	Oct 5, 2017	Orientation program of "The Better You"	STARTUP KASHMIR
06	Oct 29, 2017	One day seminar on "Importance of international certification in Design,	CETPA Infotech. Pvt. Ltd.

		Automation and IT industries"	
07	Nov 2, 2017	Interaction Session with "Prof. Anil Kumar Gupta", Founder of Honey Bee Network.	Central University of Kashmir
08	Nov 9, 2017	Catalysing a cultural shift in youth entrepreneurship	EDP Cell on National Entrepreneurship Day
09	May 07, 2018	Lecture on Gas Hydrates	Dr. Jatindra Sangwai, Centre of Ocean Technology (IIT Madras)
10	July 2018	5 day workshop on "Project Planning & Control with Primavera"	- IIED Center

2018-19

S. No.	Date	Name of Event	Delivered By
1.	March 23	Awareness Programme on "Industrial Policy, Schemes, and initiatives".	DIC Srinagar
2.	May 2019	Two Day Workshop on E-Summit	IIED Center

Assessment	10

CRITERION 6	Facilities and Technical Support	80
	Marks Claimed	80

6.1 Adequate and well equipped laboratories, and technical manpower (40)

Claimed 40

S. No.	Name of the Laboratory and Laboratory Incharge	No. of Students Per Setup (Batch Size)	Name of the Important Equipment	Weekly Utilization Status (all the courses for which the lab is utilized)	Technical Manpower Support		
					Name of Technical Staff	Designation	Qualification
1.	Fluid Mechanics and Mechanical Operations Laboratory (Dr. B. Krishna Srihari)	5	1. Reynolds Apparatus 2. Rotameter 3. Venturi meter/ Orifice meter 4. Bernoulli's Apparatus 5. Centrifugal Pump 6. Reciprocating Pump 7. Vacuum Pump 8. Ball Mill 9. Ribbon Mixer 10. Vibrating Screen 11. Trommel 12. Screw Conveyer 13. Elutriator 14. Belt Conveyer 15. Plate and Frame Filter Press 16. Jaw Crusher 17. Cyclone Separator 18. Sieve Shaker 19. Pulverizer 20. Sedimentation Apparatus	Spring Session Fluid Mechanics & Mechanical Operations Laboratory (ChBC-44 P) – 4 hrs. Total Utilization Per Week – 4hrs.	Mr. Noor Mohammad Mir	Senior Technical Assistant	Under Matric

2.	Mass Transfer Laboratory (Dr. Malik Parvez Ahmad)	5	1. Hot Air Dryer and Air Blower 2. Wetted Wall column 3. Water cooling Tower 4. Gaseous Diffusion Apparatus 5. Liquid Diffusion Setup 6. Packed Bed Tower 7. Gas Absorption Column 8. Steam Distillation Apparatus	Autumn Session Mass Transfer Laboratory (ChBC-77P) – 4 hrs. Total Utilization Per Week – 4hrs.	Mr. Abdul Sattar Bhat	Laboratory Assistant	Under Matric

3.	Process Dynamics & Control Laboratory (Dr. M.A. Rather/Dr. Shashikant Kumar)	5	1. First order system (Mercury in glass thermometer) 2. Single liquid level tank as a first order system 3. Two Tank non-interacting system 4. Two tank interacting system 5. U-tube manometer second order system. 6. Control Valve Characteristics 7. I/P And P/I Converter 8. Flow control trainer 9. Level control trainer 10. Pressure control trainer 11. Multiprocess trainer 12. Temperature measurement system	Autumn Session Process Dynamics & Control Laboratory (ChBC-74P) – 4hrs Total Utilization Per Week – 4 hrs.	Mr. Abdul Sattar Bhat	Laboratory Assistant	Under Matric

4.	Thermodynamics and Reaction Engineering Laboratory (Ms. Fatima Jalid)	5	1. Plug Flow Reactor 2. Isothermal Batch Reactor 3. Adiabatic Batch Reactor 4. Continuous Stirred Tank Reactor 5. RTD Studies in Packed Bed reactor 6. RTD Studies in CSTR	Spring Session Thermodynamics and Reaction Engineering Laboratory (ChBC-68P) – 4 hrs. Total Utilization Per Week – 4hrs.	Mr. Abdul Ahad Thoker	Laboratory Assistant	Under Matric
5..	Heat Transfer Laboratory (Dr. Kurella Swamy)	5	1. Heat Transfer by Forced Convection 2. Heat Transfer through Composite Wall 3. Drop wise and Film wise Condensation 4. Finned Tube Heat Exchanger 5. Emissivity Measurement Apparatus 6. Heat Transfer by Natural Convection 7. Shell and Tube Heat Exchanger	Autumn Session Heat Transfer Laboratory (ChBC-56P) – 4hrs. Total Utilization Per Week – 4hrs.	Mr. Mohammad Yousuf Khan	Senior Technician	Under Matric

6.	Energy Engineering Laboratory (Dr. M.A. Rather)	5	1. Pour Point Apparatus 2. Flash Point/Fire Point Apparatus 3. Smoke Point Apparatus 4. Cloud Point Apparatus 5. Incubator 6. Furnace 7. Laboratory Oven 8. Automatic Bomb Calorimeter 9. Proximate Analyzer 10. CHNS/O Analyzer 11. Hydrothermal Reactor 12. COD/Photometer 13. Dissolved Oxygen Meter 14. Double Beam Spectrophotometer	Spring Session Energy Engineering Laboratory (ChBC-65P) – 4 hrs. Autumn Session Pre-Project Work (ChBP-71) – 4 hrs. Total Utilization Per Week – 4 hrs.	Mr. Mohammad Hanief	Compassionate basis Worker	Higher Secondary
7.	Biochemical Engineering Laboratory (Prof. Muhammad N. S. Khan)		1. BOD Incubator 2. Biosafety Cabinet 3. Autoclave 4. Fermenter 5. Centrifuge 6. UV-Vis Spectrophotometer 7. Incubator Shaker 8. Bioreactor 9. Laboratory Oven	Spring Session Biochemical Engineering Lab. (ChBC-83P) – 4 hrs. Autumn Session Pre-Project Work (ChBP-71) – 4 hrs. Total Utilization Per Week – 8 hrs.	Mr. Mohammad Yousuf Khan	Senior Technician	Under Matric

Table B.6.1a

(I) Representative images of students while performing practical in various laboratories

Figure B.6.1a

Figure B.6.1b

Figure B.6.1c

Figure B.6.1d

Figure B.6.1e

Figure B.6.1f

(II) Other images of some important apparatus' in undergraduate laboratories

Figure B.6.1f: Trommel

Figure B.6.1g: Bernoulli's Apparatus

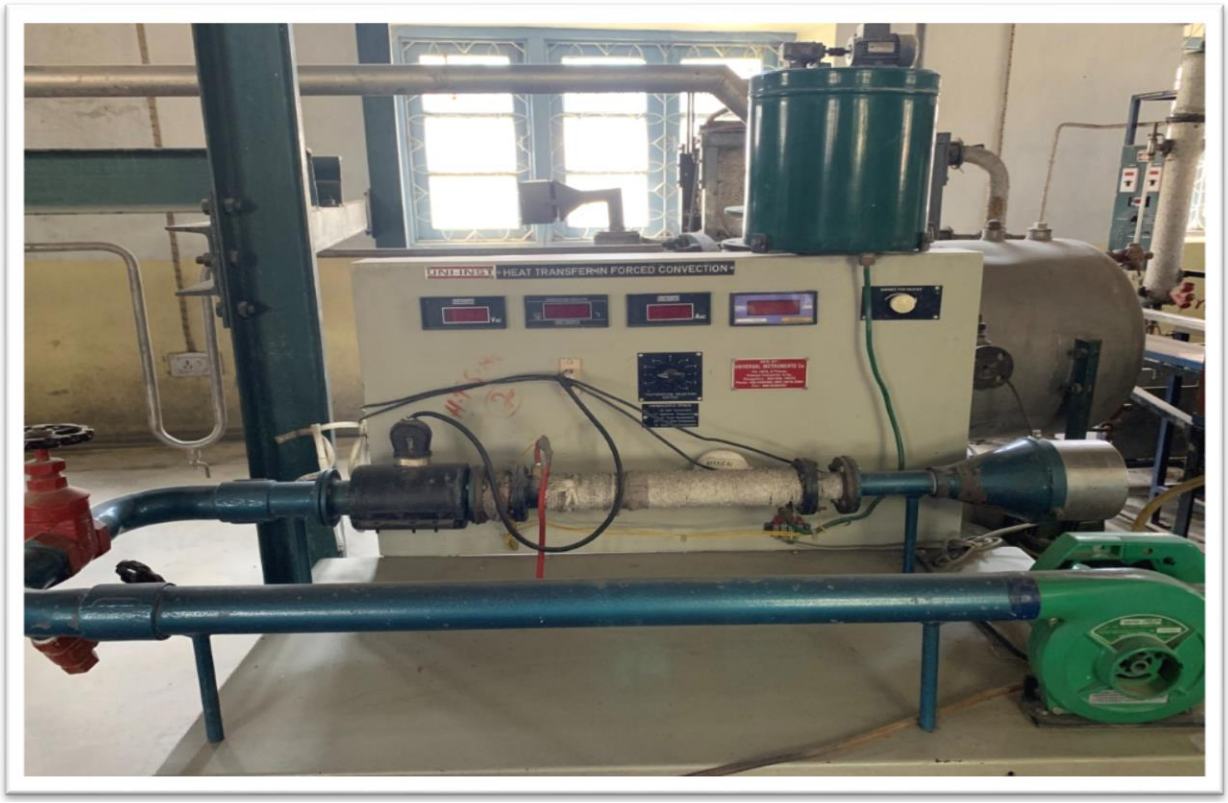


Figure B.6.1h: Heat Transfer Forced Convection

Figure B.6.1i: Multiprocess Control Trainer

Figure B.6.1j: Ball Mill

Figure B.6.1k: Reciprocating Pump

Figure B.6.1l: Dropwise/Filmwise Condensation

Figure B.6.1m: Plate and Frame Filter Press

Figure B.6.1n: Rotameter

Figure B.6.1o: Ribbon Mixer

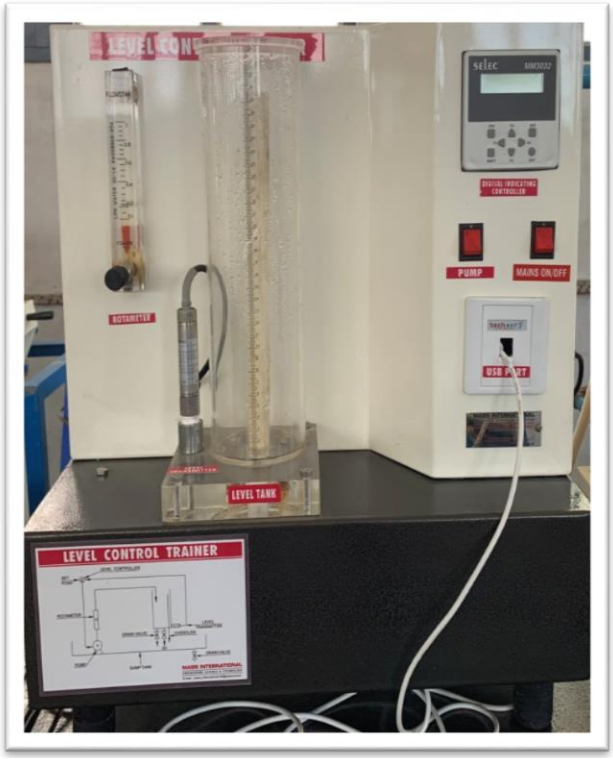


Figure B.6.1 p: Level Control Trainer

Figure B.6.1q: I/P and P/I Converter

.No	Name	Designation	Date of Appointment	Qualification
1.	Ms. Sunita Dhar	Assistant SG-I	15-03-1983	B.A
2.	Mr. Abdul Majid Dar	Senior Tech. SG-I	27-07-1998	Secondary Certificate
3.	Mr. Mohammad Hanief Teli	Compassionate basis worker	05-04-2007	Higher Secondary Certificate
4.	Mr. Ali Mohammad Shah	Mess Depute	01-03-1998	Under Matric

Table B.6.1b

S.No	Name	Date of Appointment	Present Role	Qualification
1.	Mr. Abdul Ahad Thoker	01-10-1991	Lab Assistant	Under Matric
2.	Mr. Noor Mohammad Mir	14-04-1982	Senior Technical Assistant	Under Matric
3.	Mr. Abdul Sattar Bhat	01-04-1987	Lab Assistant	Under Matric
4.	Mr. Abdul Hamid Shaikh	01-04-1980	Retired	Under Matric
5.	Mr. Bashir A. Bhat	01-04-1987	Retired	Under Matric
6.	Mr. Mohd. Yousuf Khan	11-05-1994	Senior Technician	Under Matric

Table B.6.1c

6.2 Laboratories maintenance and overall ambience (10)

Claimed 10

S. No.	Name of the Laboratory	Space, Number of Students	Number of Experiments	Number of Equipments
1.	Fluid Mechanics and Mechanical Operations Laboratory	53 m^2 (35)	13	20
2.	Mass Transfer Laboratory	53 m^2 (35)	9	8
3.	Process Dynamics & Control Laboratory	60 m^2 (35)	6	12
4.	Thermodynamics and Reaction Engineering Laboratory	52 m^2 (35)	8	6
5.	Heat Transfer Laboratory	52 m^2 (35)	7	7
6.	Energy Engineering Laboratory	40m^2 (35)	6	14
7.	Biochemical Engineering Laboratory	60 m^2 (35)	8	9

8.	Environment Engineering Laboratory	40 m^2	NA	8
9.	Membrane Science and Technology Laboratory	40 m^2	NA	7
10.	Multiphase System Laboratory	50 m^2	NA	5
11.	Catalysis Laboratory	30 m^2	NA	4

Table B.6.2a

- All the labs have sufficient space to accommodate specified number/batch of students with sufficient number of equipments.
- Groups of 5-6 students are allotted an experiment in a laboratory.
- All the labs have good ambience and experimental setups .The experiments are arranged in a manner to make the students feel at ease and use their intellect while at work.
- All the laboratories exist in the ground floor of the Departmental building.
- Proper inventory is maintained for the allied routine items, chemicals and accessories.
- Proper seating cabins for laboratory staff exists.
- Power backup in most of the laboratories exists.
- Electrical heating appliances and gas heaters are provided for heating purposes in the winter months.

6.3 Safety measures in laboratories (10)

Claimed 10

S. No.	Name of Laboratory	Safety Measures
1.	Fluid Mechanics and Mechanical Operations Laboratory	• Proper ventilation • Safety fabric gloves • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
2.	Mass Transfer Laboratory	• Proper ventilation • Safety fabric gloves • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
3.	Process Dynamics & Control Laboratory	• Proper ventilation • Miniature circuit breaker • Safety instructions chart

		• First Aid Box • Laboratory Aprons
4.	Thermodynamics and Reaction Engineering Laboratory	• Proper ventilation • Heat resistant fabric covers around heating vessels • Safety gloves • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
5.	Heat Transfer Laboratory	• Proper ventilation • Wear aprons in the laboratory • Wear shoes while operating any machine • Heat resistant fabric covers around heating vessels • Safety gloves • Miniature circuit breaker • Safety instructions chart • First Aid Box
6.	Energy Engineering Laboratory	• Proper ventilation • Safety gloves • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
7.	Biochemical Engineering Laboratory	• Proper ventilation • Safety rubber gloves • Chemical splash goggles • Chemical storage cabinets • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons

8.	Environment Engineering Laboratory	• Proper ventilation • Safety rubber gloves • Chemical splash goggles • Chemical storage cabinets • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
9.	Membrane Science and Technology Laboratory	• Proper ventilation • Safety rubber gloves • Chemical splash goggles • Chemical storage cabinets • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
10	Multiphase System Laboratory	• Proper ventilation • Safety fabric gloves • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons
11	Catalysis Laboratory	• Proper ventilation • Safety rubber gloves • Chemical splash goggles • Chemical storage cabinets • Miniature circuit breaker • Safety instructions chart • First Aid Box • Laboratory Aprons

Table B.6.3a

6.4 Project laboratory (20)

Claimed 20

S. No.	Name of Laboratory	Name of the Important Equipment	Weekly Utilization Status	Laboratory Incharge
1.	Biochemical Engineering Laboratory	1. BOD Incubator 2. Biosafety Cabinet 3. Autoclave 4. Demo fermentor 5. Centrifuge 6. UV-Vis Spectrophotometer 7. Incubator Shaker 8. Bioreactor 9. Oven	40 hrs.	Prof. Muhammad Noor Salam Khan
2.	Environment Engineering Laboratory	1. BET Analyzer 2. Orbital Incubator Shaker 3. Shaking Incubator 4. Ion meter 5. Multi-parameter Meter (pH, Conductivity, DO) 6. Water Purification System 7. UV-Visible Spectrophotometer 8. FTIR 9. Hot Air Oven 10. Sieve Shaker 11. Pyrolyzer	40 hrs.	Dr. Tanveer Rasool Dar

3.	Energy Engineering Research Laboratory	1. Pour Point Apparatus 2. Flash Point/ Fire Point Apparatus 3. Smoke Point Apparatus 4. Cloud Point Apparatus 5. Incubator 6. Furnace 7. Hot Air Oven 8. Magnetic Stirrer 9. Automatic Bomb Calorimeter 10. Proximate Analyzer 11. CHNS/O Analyzer 12. Hydrothermal Reactor 13. Double Distilled Water Unit 14. COD/Photometer 15. Dissolved Oxygen Meter 16. Autoclave 17. Double Beam Spectrophotometer 18. Temperature controller Photo Reactor 19. 10 KVA online UPS with 03 hr Backup 20. Rotaevaporator	40 hrs.	Dr. Mushtaq Ahmad Rather
4.	Membrane Science and Technology Laboratory	1. Potentiostat 2. Hydraulic Press 3. DC Power Supply 4. Hot Air Oven 5. Programmable Muffle Furnace 6. Porometer 7. Syringe Infusion Pump	40 hrs.	Dr. Fasil Q. Mir

5.	Multiphase System Laboratory	1. Rheometer 2. Packed Column 3. Ultrasonic Bath 4. Refractometer 5. UV-Spectrophotometer 6. Cryostat	40 hrs.	Dr. Malik Parvez Ahmad
6.	Catalysis Laboratory	1. Triple Output Programmable DC Power Supply 2. Electro dialysis Cell 3. Anion and Cation Exchange Membranes 4.High Performance Liquid Chromatography	40 hrs.	Ms. Fatima Jalid

Table B.6.4a

- **Images of some major sophisticated equipment recently procured by the department to impart practical knowledge to students**

Figure B.6.4a: High Performance Liquid Chromatography (HPLC)

Figure B.6.4b: Surface Area Analyzer

Figure B.6.4c: Sonicator

Figure B.6.4d: Fermenter

Figure-B.6.4e: High Pressure Autoclave

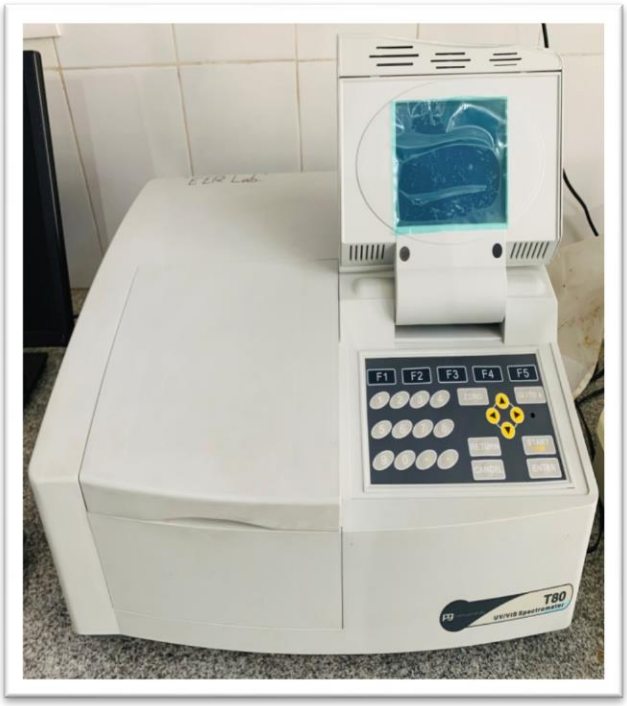


Figure B.6.4f: UV-Spectrophotometer

Figure B.6.4g: Bio Safety Cabinet

Figure B.6.4h: Hot Air Oven

Figure B.6.4i: Horizontal Shaker

Figure B.6.4j: Elemental Analyzer

Figure B.6.4k: Bioreactor

Figure B.6.4l: Centrifuge

CRITERION 7	Continuous Improvement	75
	Marks Claimed	70

7.1. Actions taken based on the results of evaluation of each of the POs & PSOs (30)

Claimed 28

As discussed in the Criterion 2, the chemical engineering department has set the attainment levels of POs and PSOs at 65%, 65% and 70% of average CO-PO & CO-PSO mapping values as target levels for the Academic Years 2017-2018, 2018-2019 and 2019-2020 respectively.

POs & PSOs Attainment Levels and Actions for improvement – Academic Year 2019-20

POs	Target Level	Attainment Level	Observations
PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO 1	**1.82**	**1.90**	Chemical engineering curriculum requires the strong foundation of theoretical and practical knowledge of science and mathematics, which the students study during their entire programme, especially in their first year, but improvement in correlating the theoretical concepts with applications is required. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken **1.** Students were encouraged to actively participate in technical events, other events where their basic knowledge should be applied in complex Engineering problems. **2.** Mathematics based courses have been added in the curriculum so that students develop the knack of attempting and solving the complex Engineering problems.			
PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.			

PO 2	**1.60**	**1.74**	The problem solving and analysis skills gained at first and second semester level courses helped the students to learn various techniques and to apply same in real application areas. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Students were encouraged to observe the real life engineering problems faced by the society in general and to gain insight into possible approaches/solutions. 2. Students were encouraged to the review research literature to explore and analyze complex engineering problems faced world over.			
PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO 3	**1.56**	**1.69**	Projects undertaken by students lacked strong social relevance and concern to environmental issues. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Students were encouraged to include in their B.Tech projects the standard parameters and the constraints pertaining to safety, societal, and environmental considerations in designing such projects. 2. Design of solutions for complex engineering problems of the public health and safety, culture, society and environmental considerations were encouraged to be undertaken by the B.Tech students.			
PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.			
PO 4	**1.45**	**1.41**	It was observed that most of the investigations/projects were

			addressing the core research areas. Target Attainment level has been reached up-to a large extent. The following actions were taken to improve the attainment level
Actions taken 1. Research oriented final year B.Tech Projects undertaken by students were encouraged to develop and hone their research skills further. 2. Students were motivated to participate in technical events/workshops/STC's/Online lectures conducted by the Department/sister departments to impart more knowledge & research methods to formulate innovative solutions to complex Chemical Engineering Problems.			
PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO 5	**1.36**	**1.15**	Up gradation of resources and modern tools is fundamental to drive meaningful research and meet industry standards. Target Attainment level has been reached to a certain extent. The following actions are made in order to sustain this attainment level.
Actions taken 1. Labs were modernized & developed by including some modern analytical & computational equipments /tools like TGA, FTIR, CHNS Analyzer, HPLC, ASPEN Plus, etc. 2. Students were encourage to use some latest version software's like MATLAB ,FLUENT and IT tools in sister Departments like Electrical Engineering, Mathematics and Mechanical Engineering. etc.			
PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO 6	**1.40**	**1.23**	The courses of Chemical Engineering need to address the needs of health, safety and social

			concerns regarding engineering practices in real life. Target Attainment level has been reached to a certain extent. The following actions were taken to improve the attainment level
Actions taken 1. Students were encouraged to take up industry related projects for their professional growth and to understand the safety, environmental & social aspects of process industries. 2. Some mandatory humanities courses were introduced in the curriculum to ensure that students are repeatedly reminded of their social responsibilities to serve in future as professional Chemical engineers.			
P07: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO 7	**1.50**	**1.19**	The issues of global and environmental awareness among the students needed to be improved. Target Attainment level has been reached up-to certain extent. The following actions were taken to improve the attainment level
Actions taken. **1.** Technical workshops related to environmental issues & renewable energy were conducted by the Department. **2.** The main emphasis on the projects for the locally available energy resources. **3.** Projects addressing the global energy issues were undertaken up by the students with a focus on consumption, utilization & proper management of energy.			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO 8	**1.32**	**0.90**	Communications and other ethical/moral knowledge needed to be improved. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level
Actions taken			

1. Motivational talks, lectures regarding ethical practices were held in the Department
2. Students were offered courses from humanities like "Ethics and Self Awareness" syllabus of which was based on ethics and sociology.

P09: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

PO 9	**1.32**	**0.98**	Ability to work as team, with coordination found to be lacking. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level

Actions taken

1. At institute level various cultural programs and alumni meetings were held where students were encouraged to work as volunteers/ organizer. This provided them with a platform/opportunity to work as individuals as well as in groups and thus helping them to groom their skills to emerge as a leader with high team spirits.
2. The laboratory work of the students is conducted by framing student groups so that students learn to work in a team environment

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

PO 10	**1.53**	**1.06**	Presentations and report writing skills and communication skills required to be further improved among the students. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level

Actions taken

1. Group discussions, seminars, presentations and soft skills training programs were organized to enhance the communication skills.
2. Regular seminars and presentations were conducted as part of curriculum with separate credit points like Industrial training presentation (ITP) and seminars to help students communicate their technical ideas.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 11	**1.36**	**1.10**	Managerial principles to students work were needed to be inculcated in students by introduction of various courses underlining these principles. Target Attainment level has been reached up-to certain extent. The following actions were taken to improve the attainment level.
Actions taken 1. The awareness was generated in students regarding managerial principles and projects by introducing some core courses like "Human Resource Development, Managerial Economics for Engineers and Basic Management Principles related to management, economics and organization of process industries.			
PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.			
PO 12	**1.50**	**1.47**	The curriculum scheme of the B.Tech program imparts knowledge of contemporary issues only. Target Attainment level has been reached to a large extent. The following actions were taken to improve the attainment level.
Actions taken 1. Through introduction of advanced level courses like Nano-Science and Technology, Fuel Cell Technology, Computational Fluid Dynamics etc that were expected to hold relevance throughout their careers, and learning skills having long term benefits. 2. Encourage the teachers to highlights the allied areas of chemical engineering to keep pace with the latest developments in the area of Chemical Engineering.			

Table B.7.1a

PSO1: Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society			
PSO1	**1.69**	**1.74**	Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Exposure of students to various sophisticated analytical tools/equipment's to motivate			

<table>
<tr><td colspan="4">them to undertake projects on burning issue in Chemical Engineering.
2. Students are encouraged to coordinate with Innovation and Entrepreneurship cell of the Institute to develop entrepreneurship skills concerning the issues of environment, safety, economics, culture and society.</td></tr>
<tr><td colspan="4">PSO2: Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.</td></tr>
<tr><td>PSO2</td><td>1.47</td><td>1.61</td><td>Target Attainment level has been reached. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. Students were offered courses from humanities like "Ethics and Self Awareness" syllabus of which was based on ethics and sociology.
2. Students were encouraged to take up industry related projects for their professional growth and to understand the safety, environmental & social aspects of process industries.</td></tr>
<tr><td colspan="4">PSO3: Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.</td></tr>
<tr><td>PSO3</td><td>1.45</td><td>1.56</td><td>Up gradation of resources and modern tools is fundamental to drive meaningful research and meet industry standards. Target Attainment level has been reached. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. Students are motivated to take up the real life problems during the project work with the focus on industrial pollution, its effects and proper remedies .Special attention is paid towards environment and energy conservation.</td></tr>
</table>

Table B.7.1b

POs & PSOs attainment levels and actions for improvement – Academic Year 2018-19

POs	Target Level	Attainment Level	Observations
PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO 1	**1.73**	**1.75**	Chemical engineering curriculum requires the strong foundations of theoretical and practical knowledge of science and mathematics, same is needed by the students during their study in entire programme.

			Improvement in correlating the theoretical concepts with applications is required. Target Attainment level has been reached. The following actions were taken to improve the attainment level.

Actions taken

1. Students were encouraged to actively participate in technical and other events where their basic knowledge was required to be applied in solving complex Engineering problems.
2. Mathematics based courses have been added in the curriculum so that students develop the knack of attempting and solving the complex Engineering problems taking advantage of same.
3. Major core courses were introduced in 2nd and 3rd year of the B. Tech curriculum, so that students develop the ability to take up the B. Tech projects involving the complex engineering problem.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO 2	**1.51**	**1.54**	The problem solving and analysis skills gained at first and second semester level courses helped the students to learn various techniques and to apply same in real application areas. Target Attainment level has been reached. The following actions were taken to improve the attainment level

Actions taken

1. Students were encouraged to visit various process industries in the country which helped them to gain firsthand knowledge about various technical problems faced by such industry.
2. Students were encouraged to observe the real life engineering problems faced by the society in general and to gain insight into possible approaches/solutions.
3. Students were encouraged to the review research literature to explore and analyze complex engineering problems faced world over.
4. Relevant techniques of mathematics, natural sciences and engineering sciences were used by the students in problem solving.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and

<table>
<tr><td colspan="4">design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.</td></tr>
<tr><td>PO 3</td><td>1.44</td><td>1.50</td><td>Projects undertaken by students initially lacked strong social relevance and concern to environmental issues. Target Attainment level has been reached. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. Students were encouraged to include in their B.Tech projects the standard parameters and the constraints pertaining to safety& sustainability in designing etc of such projects.
2. New course on Safety titled “Chemical Process Safety "was introduced in curriculum at 7th semester level ".
3. Design of solutions for complex engineering problems of the public health and safety, culture, society and environmental considerations were encouraged to be undertaken by the B.Tech students.</td></tr>
<tr><td colspan="4">PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.</td></tr>
<tr><td>PO 4</td><td>1.36</td><td>1.24</td><td>It was observed that most of the investigations/projects undertaken were addressing the core research areas lacking in taking up case studies. Target Attainment level has been reached up-to a large extent. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. The faculty of the Department participated in the high level discussions /meetings at state and national level to provide their inputs of research-based knowledge, research methods and design of experiments to solve the complex case study problems.
2. Research oriented final year B.Tech Projects were undertaken by students who were encouraged to develop and hone their research skills further.
3. Technical events/workshops/STC’s/Online lectures were conducted by the Department to impart more knowledge & research methods to stake holders to formulate innovative solutions to complex Chemical Engineering Problems.</td></tr>
<tr><td colspan="4">PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.</td></tr>
</table>

PO 5	**1.23**	**1.17**	Up gradation of resources and modern tools is fundamental to drive meaningful research and meet the industry demands/ standards. Target Attainment level has been reached up-to a large extent. The following actions were made in order to sustain this attainment level.

Actions taken

1. Labs were modernized & developed by including some modern analytical & computational equipments /tools like TGA, FTIR, CHNS Analyzer, HPLC,ASPEN Plus, etc.
2. Students were encouraged to use some latest version software's like MATLAB , FLUENT and IT tools in sister Departments like Electrical Engineering. , Mathematics and Mechanical Engineering. etc.
3. Modeling of complex engineering problems with latest version software's like FLUENT was undertaken in sister Departments like Mechanical Engineering.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 6	**1.35**	**1.13**	Chemical Engineering curriculum needs to address the issues of health, safety and social concerns in engineering practices faced in real life. Target Attainment level has been reached to a certain extent. The following actions were taken to improve the attainment level

Actions taken

1. Students were encouraged to take up industry related projects involving the safety, environmental & Social aspects for their complete professional growth.
2. Some mandatory humanities courses were introduced in the curriculum to ensure that students are repeatedly reminded of their social responsibilities to become responsible citizens in future possessing high professional qualities.
3. Relevant courses in Curriculum were introduced in scheme to assess the societal, health and safety concerns and also the consequent responsibilities relevant to the professional engineering practice.

P07: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for

<table>
<tr><td colspan="4">sustainable development.</td></tr>
<tr><td>PO 7</td><td>1.38</td><td>1.08</td><td>The issues of global environmental awareness among the students should be improved. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. The faculty of the Department participated in the high level discussions /meetings at state and national level to provide their inputs of research-based knowledge and research methods and design of experiments to solve the complex problems pertaining to environment and social issues.
2. Research oriented final year B.Tech Projects undertaken by students were focusing the environmental and societal issues.
3. Projects addressing the global energy issues were undertaken up by the students with a focus on consumption, utilization & proper management of energy.
4. Technical workshops related to environmental issues & renewable energy was conducted by the Department.
5. The main emphasis on the projects for the locally available energy resources.</td></tr>
<tr><td colspan="4">PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</td></tr>
<tr><td>PO 8</td><td>1.24</td><td>0.84</td><td>Communications and other ethical/moral knowledge needed to be improved. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. Motivational talks and lectures regarding ethical practices were held in the Department
2. Students were offered courses from humanities Department based on Ethics and Self Awareness, syllabus of which was mostly based on ethics and sociology.</td></tr>
<tr><td colspan="4">P09: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings</td></tr>
<tr><td>PO 9</td><td>1.21</td><td>0.88</td><td>Ability to work as team, with coordination was found to be lacking. Target Attainment level</td></tr>
</table>

			has been reached up-to some extent. The following actions were taken to improve the attainment level

Actions taken

1. To help the students to groom their skills to emerge as effective leaders, team work was encouraged. Various programs and counseling sessions were organized on departmental level.
2. Various professional students' chapter activities like IIChE student chapter were held in order to hone their abilities to emerge as a effective team members.
3. At institute level various cultural programs and alumni meetings were held where students were encouraged to work as volunteers/ organizers. This provided them with a platform/opportunity to work in individual's capacity as well as in groups and thus helping them to groom their skills to emerge as a leader with high team spirits.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

PO 10	**1.37**	**1.01**	Presentations and report writing and communication skills required to be further improved among the students. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level

Actions taken

1. Group discussions, seminars, presentations and soft skills training programs were organized to enhance the communication skills.
2. Regular seminars and presentations were conducted as part of curriculum with separate credit points like Industrial training presentation (ITP) and seminars to help students communicate their technical ideas.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 11	**1.29**	**0.95**	Managerial principles to students work were needed to be inculcated in students by introduction of various courses underlining these

			principles. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level
Actions taken 1. The awareness was generated in students regarding managerial principles and projects by introducing some core courses like Human Resource Development, Managerial Economics for Engineers and Basic Management Principles related to management, economics and organization of process industries. 2. Students were encouraged to undertake B.Tech projects based on their own current work and research to be an effective team member and emerge the leader of team. Students managed and achieved targets in such projects working in multidisciplinary environments like work in other sister Departments of institute, industry and both genders working together.			
PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.			
PO 12	**1.37**	**1.69**	The curriculum scheme of the B.Tech program imparted knowledge with no scope of life-long learning. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Through introduction of advanced level courses in emerging fields like Nano-Science and Technology, Fuel Cell Technology, Computational Fluid Dynamics etc that were expected to hold relevance throughout their careers and have potential to be in touch with the Department after passing out. The learning skills in industry related core courses are expected to have long term benefits. 2. Encourage the teachers to highlights the allied areas of chemical engineering to keep pace with the latest developments in the area of Chemical Engineering.			

Table B.7.1c

PSO1:Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society			
PSO1	**1.60**	**1.83**	Students hadn't proper coordination with sister departments like humanities, sciences to use same in solving complex

			problems. Interaction with the Innovation and Entrepreneurship cell of the Institute might help to shape the entrepreneurship skills. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Better coordination with sister departments like humanities and sciences etc. 2. Workshops and conferences are being organized frequently to share the concerns of the issues of environment, safety, economics, and society. 3. Exposure of students to various sophisticated analytical tools/equipments to motivate them to undertake burning issue in Chemical Engineering.			
PSO2: Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.			
PSO2	**1.38**	**1.51**	Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Motivational talks, lectures regarding ethical practices were held in the Department 2. Students were offered courses from humanities like Ethics and Self Awareness, syllabus of which was based on ethics and sociology. 3. Students were encouraged to take up industry related projects for their professional growth and to understand the safety, environmental &social aspects of process industries.			
PSO3: Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.			
PSO3	**1.30**	**1.41**	Up gradation of resources and modern tools is fundamental to drive meaningful research and meet industry standards. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Students are motivated to take up the real life problems during the project work with the focus on industrial pollution, its effects and proper remedies .Special attention is paid towards environment and energy conservation.			

Table B.7.1d

POs & PSOs Attainment Levels and Actions for improvement – Academic Year 2017-18

POs	Target Level	Attainment Level	Observations
PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO 1	**1.72**	**1.81**	Chemical engineering curriculum

			requires the strong foundation of theoretical and practical knowledge of science and mathematics, which the students study during their entire programme, especially in their first year, but improvement in correlating the theoretical concepts with applications is required. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Students were encouraged to actively participate in technical events, other events where their basic knowledge should be applied in complex Engineering application. 2. Major core courses were introduced in 2nd and 3rd year of the B-tech. curriculum, so that students can develop the ability to take up the complex engineering problem as B-tech projects in the final year.			
PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.			
PO 2	**1.49**	**1.62**	The problem solving and analysis skills gained at first and second semester level courses helped the students to learn various techniques and to apply same in real application areas. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Students were encouraged to observe the real life engineering problems faced by the society in general and to gain insight into possible approaches/solutions. 2. Students were encouraged to the review research literature to explore end analyze complex engineering problems faced world over.			

<table>
<tr><td colspan="4">PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.</td></tr>
<tr><td>PO 3</td><td>1.43</td><td>1.64</td><td>Projects undertaken by students lacked strong social relevance and concern to environmental issues.
Target Attainment level has been almost reached. The following actions were initiated to sustain and improve the attainment level.</td></tr>
<tr><td colspan="4">Actions taken
1. Students were encouraged to include in their B.Tech projects the standard parameters and the constraints pertaining to safety, societal, and environmental considerations in designing such projects.
2. New course on Safety titled "Chemical Process Safety" was introduced in curriculum at 7th semester level ".</td></tr>
<tr><td colspan="4">PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.</td></tr>
<tr><td>PO 4</td><td>1.33</td><td>1.31</td><td>It was observed that most of the investigations/projects were addressing the core research areas.
Target Attainment level has been reached. The following actions were taken to improve the attainment level.</td></tr>
<tr><td colspan="4">Actions taken
1. Research oriented final year B.Tech Projects undertaken by students were encouraged to develop and hone their research skills further.
2. Technical events/workshops/STC’s/Online lectures were conducted by the Department to impart more knowledge & research methods to stake holders to formulate innovative solutions to complex Chemical Engineering Problems.</td></tr>
<tr><td colspan="4">PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering</td></tr>
</table>

activities with an understanding of the limitations.

PO 5	**1.21**	**1.22**	Up gradation of resources and modern tools is fundamental to drive meaningful research and meet industry standards. Target Attainment level has been reached. The following actions were taken to improve the attainment level

Actions taken

1. Labs were modernized & developed by including some modern analytical & computational equipments /tools like TGA, FTIR, CHNS Analyzer, HPLC, ASPEN Plus, etc.
2. Students were encourage to use some latest version software's like MATLAB ,FLUENT and IT tools in sister Departments like Electrical Engineering. , Mathematics and Mechanical Engineering. etc.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 6	**1.31**	**1.18**	The courses of Chemical Engineering need to address the needs of health, safety and social concerns regarding engineering practices in real life. Target Attainment level has been reached up-to a large extent. The following actions were taken to improve the attainment level

Actions taken

1. Students were encouraged to take up industry related projects for their professional growth and to understand the safety, environmental &social aspects of process industries.
2. Some mandatory humanities courses were introduced in the curriculum to ensure that students are repeatedly reminded of their social responsibilities to serve in future as professional Chemical engineers.

P07: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 7	**1.35**	**1.18**	The issues of global and environmental awareness among the students should be improved. Target Attainment level has been reached. The following actions were taken to improve the attainment level

Actions taken.

1. Research oriented final year B. Tech Projects undertaken by students were focusing the environmental and societal issues.
2. Technical workshops related to environmental issues & renewable energy was conducted by the Department.
3. The main emphasis on the projects for the locally available energy resources.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 8	**1.23**	**0.88**	Communications and other ethical/moral knowledge needed to be improved. Target Attainment level has been reached. The following actions were taken to improve the attainment level

Actions taken

1. Motivational talks, lectures regarding ethical practices were held in the Department
2. Students were offered courses from humanities like "Ethics and Self Awareness" syllabus of which was based on ethics and sociology.

P09: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

PO 9	**1.22**	**0.87**	Ability to work as team, with coordination found to be lacking. Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level

Actions taken

1. Various professional students' chapter activities like IIChE student chapter were conducted to hone their abilities to emerge as an effective member in the team.
2. At institute level various cultural programs and alumni meetings were held where students were encouraged to work as volunteers/ organizer. This provided them with a

<table>
<tr><td colspan="4">platform/opportunity to work as individuals as well as in groups and thus helping them to groom their skills to emerge as a leader with high team spirits.</td></tr>
<tr><td colspan="4">PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions</td></tr>
<tr><td>PO 10</td><td>1.40</td><td>0.96</td><td>Presentations and report writing skills and communication skills required to be further improved among the students.
Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level</td></tr>
<tr><td colspan="4">Actions taken
1. Group discussions, seminars, presentations and soft skills training programs were organized to enhance the communication skills.
2. Regular seminars and presentations were conducted as part of curriculum with separate credit points like Industrial training presentation (ITP) and seminars to help students communicate their technical ideas.</td></tr>
<tr><td colspan="4">PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.</td></tr>
<tr><td>PO 11</td><td>1.30</td><td>0.89</td><td>Managerial principles to students work were needed to be inculcated in students by introduction of various courses underlining these principles.
Target Attainment level has been reached up-to some extent. The following actions were taken to improve the attainment level.</td></tr>
<tr><td colspan="4">Actions taken
1. The awareness was generated in students regarding managerial principles and projects by introducing some core courses like "Human Resource Development, Managerial Economics for Engineers and Basic Management Principles related to management, economics and organization of process industries.</td></tr>
<tr><td colspan="4">PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.</td></tr>
</table>

PO 12	**1.36**	**1.49**	The curriculum scheme of the B.Tech program imparts knowledge of contemporary issues only. Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Through introduction of advanced level courses like Nano-Science and Technology, Fuel Cell Technology, Computational Fluid Dynamics etc that were expected to hold relevance throughout their careers, and learning skills having long term benefits.			

Table B.7.1e

PSO1:Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society			
PSO1	**1.57**	**1.80**	Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Workshops and conferences are being organized frequently to share the concerns of the issues of environment, safety, economics, and society. 2. Exposure of students to various sophisticated analytical tools/equipments to motivate them to undertake burning issue in Chemical Engineering. 3. Students are encouraged to coordinate with Innovation and Entrepreneurship cell of the Institute to develop entrepreneurship skills.			
PSO2: Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.			
PSO2	**1.40**	**1.52**	Target Attainment level has been reached. The following actions were taken to improve the attainment level
Actions taken 1. Students were offered courses from humanities like "Ethics and Self Awareness" syllabus of which was based on ethics and sociology. 2. Students were encouraged to take up industry related projects for their professional growth and to understand the safety, environmental &social aspects of process industries.			
PSO3: Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.			
PSO3	**1.30**	**1.39**	Up gradation of resources and modern tools is fundamental

			to drive meaningful research and meet industry standards. Target Attainment level has been reached. The following actions were taken to improve the attainment level

Actions taken

1. Students are motivated to take up the real life problems during the project work with the focus on industrial pollution, its effects and proper remedies .Special attention is paid towards environment and energy conservation.

Table B.7.1f

7.2 Academic Audit and actions taken during the period of Assessment (15) **Claimed 14**

7.2.1. Details of the Assessment based on conduct and actions taken in relation to continuous Improvement, Academic Year 2019-2020

(a) Course files Evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
DUGC and PAC will be meeting at least twice in a semester.	The DUGC Convenor/PAC during their random checks of the lecture halls, observe and check the mode of delivery of course material by a concerned faculty member. Emphasis will given to the delivery of lectures as per the lesson plan, teaching aids used, communication skills and classroom management etc. **2.** Regular analysis of the results of mid-term and major examinations of all subjects is done..	Faculty members incorporate changes suggested by the DUGC and PAC for any gaps and recommends actions to be initiated to ensure quality deliverables.	**1.** Faculty members have to match the pace of their deliverables as per the students requirements as well as they have to schedule the lecture plans in such a way that the syllabus is completed in time. To achieve this they can arrange extra lectures on appropriate times. **2.** Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of teaching-learning. **3.** Regular analysis of the results of mid-term and major examinations of all subjects is done and concerned faculty is guided to initiate necessary actions. **4.** Remedial classes are

			scheduled in reference to academic progress of the student, who appear for supplementary examinations

Table B.7.2.1a

(b) Lectures/ Lab Evaluation

Frequency	**Conduct Mechanism**	**Action Plan**	**Implementation**
DUGC and PAC will be meeting at least twice in a semester.	**1.** The committee performs audit of laboratory files i.e. verify the contents of the lab course file, experimental plan, evaluation procedure etc. **2.** The PAC takes random checks of the laboratories during experiments to get ready information to assess the quality of the delivery and evaluation. **3**. Moreover a safety audit is conducted by the PAC in addition to the conduct of laboratory experiments in proper and fruitful manner.	The parameters are assessed to ensure the teaching methods of benchmarked standards are being used throughout the institute. Feedback is communicated to the concerned faculty member.	Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of Experimentation & exposure to newer techniques of analysis. The FDPs are carried out at the institute level itself by the learning and development team mainly sponsored under TEQIP-III.

Table B.7.2.1b

No Academic Audit was carried out due to following reasons:

1. *The abrogation of Article 370in J&K state by the Central Government and remaining incommunicado for around six months following August 5, 2019.*
2. *The surge of COVID-19 cases and subsequent lockdown of the whole country from March-2010 till August-2020.*

7.2.2. Details of the Assessment based on conduct and actions taken in relation to continuous Improvement, Academic Year 2018-2019

(a) Course files Evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
DUGC and PAC will be meeting at least twice in a semester.	**1** The DUGC Convenor/PAC during their random checks of the lecture halls, observe and check the mode of delivery of course material by a concerned faculty member. Emphasis will given to the delivery of lectures as per the lesson plan, teaching aids used, communication skills and classroom management etc. **2.** Regular analysis of the results of mid-term and major examinations of all subjects is done.	Faculty members incorporate changes suggested by the DUGC and PAC for any gaps and recommends actions to be initiated to ensure quality deliverables.	**1.** Faculty members have to match the pace of their deliverables as per the students requirements as well as they have to schedule the lecture plans in such a way that the syllabus is completed in time. To achieve this they can arrange extra lectures on appropriate times. **2.** Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of teaching-learning. **3.** Regular analysis of the results of mid-term and major examinations of all subjects is done and concerned faculty is guided to initiate necessary actions. **4.** Remedial classes are scheduled in reference to academic progress of the student, who appear for supplementary examinations

Table B.7.2.2a

(b) Lectures/ Lab Evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
DUGC and PAC will be meeting at least twice in a semester.	**1.** The committee performs audit of laboratory files i.e. verify the contents of the lab course file, experimental plan, evaluation procedure etc. **2.** The PAC takes a random checks of the laboratories during experiments to get ready information to assess the quality of the delivery and evaluation. **3**. Moreover a safety audit is conducted by the PAC in addition to the conduct of laboratory experiments in proper and fruitful manner.	The parameters are assessed to ensure the teaching methods of benchmarked standards are being used throughout the institute. Feedback is communicated to the concerned faculty member.	Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of Experimentation & exposure to newer techniques of analysis. The FDPs are carried out at the institute level itself by the learning and development team mainly sponsored under TEQIP-III.

Table B.7.2.2b

(c) Academic Audit Report through External Experts

In addition to the above exercise an academic audit by an expert committee from outside the institute was initiated from the year 2017 onwards. The report and the actions taken are summarised as under:

Auditors Names:

1. Dr. G. A. Wani
   Professor & Ex. Head, Department of Chemical Engg., N.I.T Srinagar.

2. Dr. M. A. Baba
   Professor & Ex. Head, Department of Chemical Engg., N.I.T Srinagar

Date of Audit: 04-05-2019

Proposed	***Action***
Purchasing of few sophisticated instruments like: GC, TGA, FTIR, GC-MS, HPLC, FE_SEM, X-RD, Ion chromatography, COD Analyser, TOC analyser, pore area distribution analyser.	TGA (order placed) COD Analyser purchased GC-MS in pipeline under CRFC DO/PH/Ion Meter purchased CHNS Analyser purchased FTIR purchased HPLC purchased
The trend started by department faculty members of publishing research papers in reputed journals like Elsevier, ACS, Taylor-Francis should be encouraged amongst PhD and M.Tech students.	The trend has been taken initiated as suggested and for details of published papers given in criteria 5.
The department should initiate interaction with industries present in J&K as well as other parts of the country in form of lectures from industrial personnel, academia-industry interaction sessions/workshops.	The department has initiated conducting workshop / STC's etc. In last 3 years 3 STC's and 2 workshops were conducted Following are the details Coordinated a one day workshop on Process Safety on 8th of June 2017 Coordinated five day national level workshop on Environment title "Connecting people to nature-CPTN-17" from 25-29th Sep., 2017. Coordinated five day workshop on Process Control from 13th to 17th of November 2017 Coordinated five days S.T.C on Transport Process in Jan-2018.
Efforts should be made to Interact students with visiting faculties from eminent industries and academia.	The suggestion has been widely implemented. Following are the details of visiting faculties and industry persons: Mr. Junaid Ashraf, IOCL Dr. I.M. Mishra, IIT/ISM Dhanbad Dr. V.C. Srivastava, IIT Roorkee Dr. M.K. Jha, NIT Jalandhar Dr. Jatindra Sangwai, IIT Madras Mr. Parvaiz Qalander, Ex. GM JK Cements
Computational facilities of the department should	Purchase of software is in pipeline (Tendered)

further be augmented with addition of high end computational facilities, cluster computing, servers, etc. A full high end computer lab with chemical engineering related softwares such as ANSYS, ASPEN PLUS, COMSOL, GEMS, MATLAB, MATHEMATICA, MAPPLE, STATISTICA etc should be established. Moreover both undergrad and postgrad students should be given projects that would acquaint them with these softwares, to increase there employability and motivate them to further research	
Books in the central library regarding Chemical Engineering should be increased. Further, the students may be issued six textbooks for the entire semester, three references and research books for maximum 15 days. Digitisation of library may be done on priority basis and linked to the department computers.	Implemented as proposed/suggested.
Subscription to chemical engineering journals should be increased for benefit of research students and faculty.	Implemented as suggested
Effort should be made to submit a proposal to IIChE (Indian Institute of Chemical Engineers)headquarters, Kolkata for opening a new Srinagar regional centre with its headquarters at NIT Srinagar.	The chapter of IIChE is already in place. However we are in a process of submitting the proposal for regional centre of IIChE at NIT SRINAGAR. Recently on 30-12-2019, Dr. Jha, Hon. Treasurer IIChE visited the department and worked out the possibilities for the same.
It is recommended that provision may be made to admit against vacant seats for M.Tech. program of Chemical Engineering, based on written examination to be conducted by the Institute.	Proposal in this regard stand submitted before senate for approval.
It's recommended that more number of research scholars unfilled in other departments, may be transferred to the department of Chemical Engineering till increase in number of PhD scholars.	Proposal approved. The number of PhD scholars has increased to a large extent.
Renovation of all laboratories of the department may be initiated with floor tiling, False-ceiling	Done in most of the cases. Energy Engineering Lab.

and air conditioners, wherever necessary, on priority basis.	Environmental Engg. Lab. Membrane Laboratory. Biochemical Engineering Lab. Catalysis lab. Rheology & Two phase flow lab
There is an urgent need of submission of sponsored research proposals by the department faculty members to various central and state funding agencies like DST, CSIR, MHRD, MOEF, DAE, DRDO, Council of Science and Technology J&K, etc.	One project sanctioned by MHRD (Briquetting of Dal Lake weeds to be used as fuel source) Total Budget: 23.94 Lacks. D.O.C: Jan.-2018. Others in pipeline...

Table B.7.2.2c

7.2.3. Details of the Assessment based on conduct and actions taken in relation to continuous Improvement, Academic Year 2017-2018

(a) Course files Evaluation

Frequency	**Conduct Mechanism**	**Action Plan**	**Implementation**
DUGC and PAC will be meeting at least twice in a semester.	The DUGC Convenor/PAC during their random checks of the lecture halls, will observe and check the mode of delivery of course material by a concerned faculty member. Emphasis is given to the delivery of lectures as per the lesson plan, teaching aids used, communication skills and classroom management etc. **2.** Regular analysis of the results of mid-term and major examinations of all subjects is done.	Faculty members incorporate changes suggested by the DMC and PAC for any gaps and suggest and recommend actions to be initiated to ensure quality deliverables.	**1.** Faculty members have to match the pace of their deliverables as per the student's requirements as well as they have to schedule the lecture plans in such a way that the syllabus is completed on time. To achieve this they can arrange extra lectures on appropriate times. **2.** Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of teaching-learning. **3.** Regular analysis of the results of mid-term and major examinations of all subjects is done and concerned faculty is guided to initiate necessary

			actions. **4.** Remedial classes are scheduled in reference to academic progress of the student, who appear for supplementary examinations

Table B.7.2.3a

(b) Lectures/ Lab evaluation

Frequency	**Conduct Mechanism**	**Action Plan**	**Implementation**
DUGC and PAC will be meeting at least twice in a semester.	**1.** The committee performs audit of lab course files i.e. verify the contents of the course file, lesson plan, extra material lecture notes, evaluation procedure etc. **2.** Moreover a safety audit is conducted by the PAC in addition to the conduct of laboratory experiments in proper and fruitful manner.	The parameters are assessed to ensure the teaching methods of benchmarked standards are being used throughout the institute. Feedback is communicated to the concerned faculty member.	Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of techniques of analysis and to get exposure to new tools. The FDPs are carried out at the institute level itself by the learning and development team mainly sponsored under TEQIP-III.

Table B.7.2.3b

(c) Academic Audit Report through External Experts

In addition to the above exercise an academic audit by an expert committee from outside the institute was initiated from the year 2017 onwards. However in 2018, an audit was conducted through the following faculty members.

Auditors Name:

1. Dr. I. M. Mishra
   Professor, Department of Chemical Engg., N.I.T Jalandhar.
2. Dr. V. C. Srivastava
   Associate Professor, Department of Chemical Engg., I.I.T Roorkee

Date of Audit: 21-04-218

Proposed	*Action*
o Purchasing of few sophisticated instruments like: GC, TGA, FTIR, GC-MS, HPLC, FE_SEM, X-RD, Ion chromatography, COD Analyser, TOC analyser, pore area distribution analyser.	❖ TGA (order placed) ❖ COD Analyser purchased ❖ GC-MS in pipeline under CRFC ❖ DO/PH/Ion Meter purchased ❖ CHNS Analyser purchased ❖ FTIR purchased ❖ HPLC purchased
o The trend started by department faculty members of publishing research papers in reputed journals like Elsevier, ACS, Taylor-Francis should be encouraged amongst PhD and M. Tech students.	❖ The trend has been taken initiated as suggested and for details of published papers given in criteria 5.
o The department should initiate interaction with industries present in J&K as well as other parts of the country in form of lectures from industrial personnel, academia-industry interaction sessions/workshops.	❖ The department has initiated conducting workshop / STC's etc. ❖ In last 3 years 3 STC's and 2 workshops were conducted Following are the details ✓ Coordinated a one day workshop on Process Safety on 8th of June 2017 ✓ Coordinated five day national level workshop on Environment title "Connecting people to nature-CPTN-17" from 25-29th Sep., 2017. ✓ Coordinated five day workshop on Process Control from 13th to 17th of November 2017 ✓ Coordinated five days S.T.C on Transport Process in Jan-2018.
o Efforts should be made to Interact students with visiting faculties from eminent industries and academia.	❖ The suggestion has been widely implemented. Following are the details of visiting faculties and industry persons: ✓ Mr. Junaid Ashraf, IOCL ✓ Dr. I.M. Mishra, IIT/ISM Dhanbad ✓ Dr. V.C. Srivastava, IIT Roorkee ✓ Dr. M.K. Jha, NIT Jalandhar ✓ Dr. Jatindra Sangwai, IIT Madras ✓ Mr. Parvaiz Qalander, Ex. GM JK Cements

o Computational facilities of the department should further be augmented with addition of high end computational facilities, cluster computing, servers, etc. A full high end computer lab with chemical engineering related softwares such as ANSYS, ASPEN PLUS, COMSOL, GEMS, MATLAB, MATHEMATICA, MAPPLE, STATISTICA etc should be established. Moreover both undergrad and post graduate students should be given projects that would acquaint them with these softwares, to increase there employability and motivate them to further research	❖ Purchase of software is in pipeline (Tendered)
o Books in the central library regarding Chemical Engineering should be increased. Further, the students may be issued six textbooks for the entire semester, three references and research books for maximum 15 days. Digitisation of library may be done on priority basis and linked to the department computers.	❖ Implemented as proposed/suggested.
o Subscription to chemical engineering journals should be increased for benefit of research students and faculty.	❖ Implemented as suggested
o Effort should be made to submit a proposal to IIChE (Indian Institute of Chemical Engineers)headquarters, Kolkata for opening a new Srinagar regional centre with its headquarters at NIT Srinagar.	❖ The chapter of IIChE is already in place.
o Renovation of all laboratories of the department may be initiated with floor tiling, False-ceiling and air conditioners, wherever necessary, on priority basis.	❖ Done in most of the cases. ✓ Energy Engineering Lab. ✓ Environmental Engg. Lab. ✓ Others in pipeline

Table B.7.2.3c

7.3 Improvement in Placement, Higher Studies and Entrepreneurship (10)

Claimed 9

- **Improvement in Placement, Higher studies**

Academic Year	Number of students enrolled	Number of students placed	Number of students opted for higher studies	Percentage of placement and higher studies
2019-2020	34	6	5	32.35
2018-2019	60	13	6	31.66
2017-2018	64	12	8	31.25

Table B. 7.3a

Note: Although the number of students placed has decreased, but the number of students actually placed in core companies has increased subsequently. It is observed that placement data is slightly unpromising for CAY 2019-2020. This can be attributed to the unfortunate COVID-19 pandemic in Spring 2020, that negatively affected the placement drives as well as job market. However, this was compensated with a larger percentage of students opting for higher studies.

- **Higher Studies**

Academic Year/ Department	Student Strength	Number of students opted for Higher Studies
2019-2020	**34**	5
2018-2019	**60**	6
2017-2018	**64**	8

Table B.7.3b

Note: Number of students admitted for higher studies has increased.

7.4. Improvement in the quality of students admitted to the program (20)

Claimed 19

Student quality is assessed through the opening and closing ranks in JEE Mains, of students admitted into the undergraduate program of Chemical engineering department.

Opening and closing rank analysis:-

Item		2020-2021	2019-2020	2018-2019
Joint Entrance Examination, main (JEE main)	**No. of Students admitted**	92	73	69
	Opening Rank(GN)	OP-45334 OBC- 51084 SC- 148859 ST-220405 EWS-71366	OP-44391 OBC- 71170 SC-120962 ST-205065	OP-57290 OBC-52410 SC-173008 ST-197165
	Closing Rank(GN)	OP-417361 OBC-103297 SC- 508016 ST-513764 EWS-394653	OP- 167048 OBC- 575193 SC- 543611 ST- 440549	OP-728594 OBC-219696 SC-489361 ST-358480

Table B.7.4a

Item	2020-2021	2019-2020	2018-2019
No. of Students admitted	92	73	69
Average PCM Percentage	76%	78%	88.13%

Table B.7.4b

CRITERION 8	First Year Academics	50
	Marks Claimed	43.46

8.1. First Year Student-Faculty Ratio (FYSFR) (5)

Claimed 5

Data for first year courses to calculate the FYSFR:

In order to determine the First Year Student Faculty Ratio (FYSFR) we obtained the number of faculty member (F) contributing in first year courses considering their fractional load. The number of faculty member (F) is rounded off to nearest integer. The actual intake of students in all branches together is taken as the number of students (N). The ratio of number of faculty members (F) and the number of students (N) gives us the FYSFR. Assessment (limited to 5) is determined from the formula (5×20)/FYSFR. These calculations are tabulated below:

Year	Number of Students (actual intake, N)	Number of Faculty Members (F)	FYSFR	Assessment = (5×20)/FYSFR (Limited to Max.5)
CAY (2020-2021)	899	52	17.28	5
CAYm1 (2019-2020)	778	46	16.91	5
CAYm2 (2018-2019)	672	36	18	5
Average	**783**	**44**	**17.3**	**5**

Table B.8.1

8.2. Qualification of Faculty Teaching First Year Common Courses (5)

Claimed 4.76

Assessment of qualification = $(5X+3Y)/RF$, X=Number of Regular Faculty with Ph.D., Y=Number of Regular Faculty with Post-graduate qualification, RF=Number of Faculty required as per SFR of 20:1, Faculty definition as defined in 5.1. Most Faculty (X) are doctorates, however, few Faculty (Y) are postgraduates. The Number of Faculty Members (RF) is determined by dividing the Number of Students (N) by 20. The numbers are shown in the table given below:

Academic Year	*X*	*Y*	*RF*	Assessment of Faculty Qualification $(5X+3Y)/RF$
CAY(2020-2021)	*30*	*22*	*45*	5.4
CAYm1(2019-2020)	*24*	*22*	*38.9*	*4.78*
CAYm2(2018-2019)	*15*	*21*	*33.6*	*4.10*
Average Assessment				**4.76**

Table B.8.2

8.3. First Year Academic Performance (10)

Claimed 5.7

Academic Performance Index (API)= *(Mean of 1st Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks in First Year of all successful students/10) × (number of successful students/number of students appeared in the examination). Successful students are those who are permitted to proceed to the second year.*

The Mean of 1st Year Grade Point Average (GPA) of all successful Students on a 10 point scale (G), is taken as average of the mean of Student Performance Index (SPI) for Semester-I and Semester-II, of all successful Students promoted to 2nd year. The backlog students have not been considered in these calculations.

Academic year	1st Year Mean GPA (G)	No. of Successful Students (S)	No. of Students Appeared (N)	API= G×(S/N)	Average API
2019-2020	7.65	637	640	7.61	**5.7**
2018-2019	7.17	375	481	5.59	
2017-2018	7.11	235	439	3.81	

Table B.8.3

8.4. Attainment of Course Outcomes of first year courses (10)

Claimed 10

8.4.1. Describe the assessment processes used to gather the data upon which the evaluation of Course Outcomes of first year is done (5)

Claimed 5

Assessment Processes:

There are two assessment processes:

(i) Direct Assessment Processes:
- **(a) Mid Term Exam**
- **(b) End Semester Exam**
- **(c) Practical Exam**
- **(d) Continuous Assessment (Assignments)**

(ii) Indirect Assessment Processes:
- **(a) Course Exit Survey**
- **(b) Program Level Surveys (not applicable for 1st year)**

To assess the course outcomes, direct and indirect assessment processes are used. Direct assessment consists of one internal and one end-semester examination whereas indirect assessment is obtained using course exit survey. The Internal Assessment (including assignments and one mid-term examination) contributes to 40% and End Semester Examination contributes to 60% of the overall assessment of each Course Outcome.

Overall Attainment of Program Outcomes is determined as below:

80% of the Direct Attainment

20% of the Indirect Attainment

Examination questions are designed to test the Attainment Level of the defined Course Outcomes. In general, mid-term examination (of 30 marks) is used to assess the Attainment Level for CO1 and CO2 respectively, the assignment (of 10 marks) is used to assess attainment of CO3. The questions of end-semester examination (of 60 marks) are equally distributed over all five COs of the course. However, teachers are free to use their own methods to determine the attainment of COs using different distribution of marks.

The students admitted to the first year of B.Tech. Courses are grouped in Eight Sections. The CO attainment (for all COs) for a particular course is determined separately for each section and their average is taken as the attainment of the COs for that particular course. The total marks obtained by the students (of a particular section) in each CO are combined together. The attainment level of a particular CO (in percentage) is determined by taking the ratio of the total marks obtained by the students and the total marks allocated to that CO. The percentage of marks is categorized in three groups and assigned different weightage.

Attainment Levels: (For Theory Subjects)

For Academic Year 2018-2019 & 2019-20

50% students scoring more than benchmark (50%) ---Level-1
60% students scoring more than benchmark (50%) ---Level-2
70% students scoring more than benchmark (50%) ---Level-3

For Academic Year 2017-2018

50% students scoring more than benchmark (40%) ---Level-1
60% students scoring more than benchmark (40%) ---Level-2
75% students scoring more than benchmark (40%) ---Level-3

(For Laboratory Subjects)

For Academic Year 2017-2018, 2018-2019 & 2019-20

60% students scoring more than benchmark (50%) ---Level-1
70% students scoring more than benchmark (50%) ---Level-2
80% students scoring more than benchmark (50%) ---Level-3

Course Structure of B. Tech. 1st Year (Scheme till Spring 2019)

1st Semester (Common to All Branches): Autumn

S. No.	Course Type	Course Code	Course Name	Credit	L	T	P	HRS	Maximum Marks	
									Mid-term	End-term
1.	Theory	HSS-101	Communication Skills & Oral Presentation	03	3	0	0	3	30	60
2.	Theory	PHY-101	Physics – I	03	2	1	0	3	30	60
3.	Theory	CHM-101	Chemistry-I	03	2	1	0	3	30	60
4.	Theory	MTH-101	Mathematics - I	03	3	1	0	4	30	60
5.	Theory/Lab	CIV-102	Engineering Drawing	03	2	0	0	4	30	60
6.	Theory	IT-101	Computer Fundamentals and Problem-Solving Techniques	03	3	3	0	3	30	60
7.	Lab	WSP-1	Workshop Practice-I	02	0	0	4	3	40	60
8	Lab	PHY-102P	Physics Lab	01	0	0	2	3	40	60
9	Lab	CHM-101P	Chemistry Lab	01	0	0	2	3	40	60
10	Lab	IT-1023	Computer Fundamental Lab	01	0	0	2	3	40	60

Table B.8.4.1a

2st Semester (Common to All Branches): Spring

S. No.	Course Type	Course Code	Course Name	Credit	L	T	P	HRS	Maximum Marks	
									Mid-term	End-term
1.	Theory	HSS-201	Introduction to Social Sciences	03	3	0	0	3	30	60
2.	Theory	PHY-201	Physics – II	03	2	1	0	3	30	60
3.	Theory	CHM-201	Chemistry-II	03	2	1	0	3	30	60
4.	Theory	MTH-201	Mathematics - II	03	3	1	4	3	30	60
5.	Theory	MEC-201	Machine Drawing	03	1	0	4	3	30	60
6.	Theory	CSE-201	Computer Programming	03	3	3	0	3	30	60
7.	Theory	CIV-	Strength of Materials	03	3	3	0	3	30	60
8	Lab	WSP-2	Workshop Practice-II	02	0	0	4	2	40	60
9	Lab	PHY-202P	Physics Lab	01	0	0	2	2	40	60
10	Lab	CHM-201P	Chemistry Lab	01	0	0	2	3	40	60
11	Lab	CSE-202P	CSE Lab	01	0	0	2	2	40	60

Table B.8.4.1b

Course Structure of B. Tech. 1st Year (New Scheme from autumn 2019)
1st Semester (Group A)

Electrical / Electronics & Comm. / Computer Science / Information Technology

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	EEL100	Basic Electrical Engineering	Electrical	4	3	1	0	4
2	HUL100	Basic English and Communication Skills	Humanities	3	2	1	0	3
3	ITL100	Computer Programming	Information Technology	3	2	1	0	3
4	CYL100	Engineering	Chemistry	4	3	1	0	4

		Chemistry						
5	CIP100	Engineering Drawing	Civil	4	1	0	6	7
6	MAL100	Mathematics I	Mathematics	4	3	1	0	4
7	ELP100	Basic Electrical Engineering Laboratory	Electrical	1	0	0	2	2
8	CYP100	Chemistry Laboratory	Chemistry	1	0	0	2	2
9	ITP100	Computer Programming Laboratory	Information Technology	1	0	0	2	2
		Total		25	14	5	12	31

Table B.8.4.1c

1st Semester (Group B)

Civil/ Mechanical / Chemical / Mett& Mat Science

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	MEL100	Elements of Mechanical Engg.	Mechanical	3	2	1	0	3
2	PHL100	Engineering Physics	Physics	4	3	1	0	4
3	CIL100	Engineering Mechanics	Civil	4	3	1	0	4
4	HUL100	Basic English and Communication Skills	Humanities	3	2	1	0	3
5	CYL101	Environmental Studies	Chemistry	3	2	1	0	3
6	MAL100	Mathematics I	Mathematics	4	3	1	0	4
7	HUP100	Language Laboratory	Humanities	1	0	0	2	2
8	PHP100	Physics Laboratory	Physics	1	0	0	2	2
9	WSP100	Work shop Practice	Work shop	2	0	0	5	5
		Total		25	15	6	9	30

Table B.8.4.1d

2nd Semester (Group A)

Electrical / Electronics & Comm. / Computer Science / Information Technology

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	HUL101	Advanced English Comm. Skills & Organizational Behavior	Humanities	3	2	1	0	3
2	PHL100	Engineering Physics	Physics	4	3	1	0	4
3	CIL100	Engineering Mechanics	Civil	4	3	1	0	4

4	MEL100	Elements of Mechanical Engg.	Mechanical	3	2	1	0	3
5	CYL101	Environmental Studies	Chemistry	3	2	1	0	3
6	MAL101	Mathematics II	Mathematics	4	3	1	0	4
7	HUP100	Language Laboratory	Humanities	1	0	0	2	2
8	PHP100	Physics Laboratory	Physics	1	0	0	2	2
9	WSP100	Work shop Practice	Work shop	2	0	0	5	5
		Total		25	15	6	8	30

Table B.8.4.1e

2nd Semester (Group B)

Civil/ Mechanical / Chemical / Mett& Mat Science

S. No.	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
1	HUL101	Advanced English Comm. Skills & Organizational Behavior	Humanities	3	2	1	0	3
2	EEL100	Basic Electrical Engineering	Electrical	4	3	1	0	4
3	ITL100	Computer Programming	Information Technology	3	2	1	0	3
4	CYL100	Engineering Chemistry	Chemistry	4	3	1	0	4
5	CIP100	Engineering Drawing	Civil	4	1	0	6	7
6	MAL101	Mathematics II	Mathematics	4	3	1	0	4
7	ELP100	Basic Electrical Engineering Laboratory	Electrical	1	0	0	2	2
8	CYP100	Chemistry Laboratory	Chemistry	1	0	0	2	2
9	ITP100	Computer Programming Laboratory	Information Tchnology	1	0	0	2	2
		Total		25	14	5	12	31

Table B.8.4.1f

Assessment Processes (Sample)

Course Outcomes (COs) are defined for each course by the concerned teachers and approved by DUGC of the department. The Course Outcomes are displayed on notice boards and also explained to the students by the concerned teachers in the beginning of the course. The COs of each (theory and lab) courses are mapped with Program Outcomes (POs). The CO-PO mapping table for the sample course Paper Code: HSS-101 Autumn Semester (2017), 1st Semester (1st Year), B. Tech Civil Engineering; Subject: Communication Skills and Oral Presentation (HSS 101) are shown in the below Table B.8.4.1g.

Course Articulation Matrix for the sample course HSS-101

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
HSS-101.CO1	To exhibit effective reading and writing skills.									2	3	2	
HSS-101.CO2	To use grammatical elements correctly.									2	2	2	
HSS-101.CO3	To produce project reports with efficient technical writing skills.									2	3	3	
HSS-101.CO4	To give effective oral presentation in English.									3	2	2	
	Average Value									**2.25**	**2.5**	**2.25**	

Table B.8.4.1g

The syllabus based CO-PO mapping of all courses offered during first year:
The Program Articulation Matrix for the first year courses

Course Name	Course Code	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Communication Skills & Oral Presentation	HSS-101									2.25	2.5	2.25	
Physics – I	PHY-101	3	3	2.75	2	2	1			1			
Chemistry-I	CHM-101	2.5	1.5			2.5	2	2.25			1.33	2	1.25
Mathematics - I	MTH-101101	2.4	1.8	2.6								1	
Engineering Drawing	CIV-102	3	3	3	3	2	2	2		3	3	2	2
Computer Fundamentals and Problem-Solving Techniques	IT-101	2.5	3	1		2							2
Workshop Practice-I	WSP-1	3	1	1		1	1	2	1	3	1	2	2
Physics Lab	PHY-102P	3	3	2.75	2	2	1			1			
Chemistry Lab-I	CHM-101P	2.5	1.5			2.5	2	2.25			1.33	2	1.25
Computer Fundamental Lab	IT-1023	2	2.5	2.75	2.5	2				1	2		
Introduction to Social Sciences	HSS-201			2			1.75	1.5	1.5	2	2	1.5	2
Physics – II	PHY-201	3	3	2.75	1.25	1				1			
Chemistry-II	CHM-201	2.2	1.75	2	1.5	1	1	2.33	1	1	2		1.75
Mathematics - II	MTH-201	2.4	1.8	2.6								1	
Machine Design	MEC-201	2.5	1	2.5	1				1.25	1			1
Computer Programming	CSE-201	2.7	2.33	2.5	3	1.75							2.5
Workshop Practice-II	WSP-2	3	1	2		1	3	2	1	3	1	2	2
Physics Lab-II	PHY-202P	3	3	2.75	2	2	1			1			
Chemistry Lab-II	CHM-201P	2.5	2	1.75			1.75	2			1.5	1.33	1.25
CSE Lab	CSE-202P	2	2.5	2.75	2.5	2				1	2		
Strength of Materials	CIV-201	3	3	1.8	1.8		2	1					
Average		2.6	2.2	2.3	2.1	1.8	1.6	1.9	1.2	1.6	1.8	1.7	1.7

Table B.8.4.1h

The syllabus based CO-PO mapping of all courses offered as per New Scheme from (Autumn 2019)

1st Semester (Group A) Electrical / Electronics & Comm. / Computer Science / Information Technology													
S. No.	Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	EEL100	Basic Electrical Engineering	2.66	1.6	1.5	2.5	1	1.25					2.25	1.4
2	HUL100	Basic English and Communication Skills						1			2	3	2	2
3	ITL100	Computer Programming	3	3	3		3						2	2
4	CYL100	Engineering Chemistry	2.25	2	2	1		1.5	2	1	1	2	2	2.25
5	CIP100	Engineering Drawing	3.0	3.0	3.0	3.0	2.0	2.0	2.0		3.0	3.0	2.0	2.0
6	MAL100	Mathematics I	2.4	1.8	2.6								1	
7	ELP100	Basic Electrical Engineering Laboratory	2.5	2.3		1.8		2.5	2				2.25	2.5
8	CYP100	Chemistry Laboratory	2.5	2	2.25	1		1.5	2	1	1	2	2	2.5
9	ITP100	Computer Programming Laboratory	3	3	3		3					2	2	2
10	MEL100	Elements of Mechanical Engg.	3	2	2							2		3
11	PHL100	Engineering Physics	3	3	3	2	2	2			2			
12	CIL100	Engineering Mechanics	3	2	2							2		3
13	HUL101	Advanced English Comm. Skills & Organizational Behavior						2			2	3	2	1
14	CYL101	Environmental Studies	2.75	2.5	3	0	1.75	2.75	3	0	0	2	1.5	2.25
15	MAL101	Mathematics II	2.4	1.8	2.6								1	1
16	HUP100	Language Laboratory									2	3	2	1
17	PHP100	Physics Laboratory	3	3	3	3	3	1			1			
18	WSP100	Work shop Practice	3	1	1		2	2	2	2	3	2		3
		Average	2.76	2.27	2.43	2.04	2.22	1.77	2.17	1.33	1.89	2.36	1.85	2.06

Table B.8.4.1i

8.4.2. Record the attainment of Course Outcomes of all first year courses (5) **Claimed 5**

The Attainment Level of Course Outcomes of first year courses is determined using the procedure explained in previous section. The calculation table for direct and indirect attainment of COs for the sample course Paper Code: HSS-101 Autumn Semester (2017), 1st Semester (1st Year), B. Tech Civil Engineering; Subject: Communication Skills and Oral Presentation (HSS 101) is shown in the table given below:

Determination of average correlated attainment of COs for the Sample Course

S. No	Course Outcome	CO attainment (Direct Assessment)	CO attainment (Indirect Assessment)	Overall 80% Direct + 20% Indirect
1	CO1	2	2.43	2.08
2	CO2	2	2.53	2.10
3	CO3	2	2.50	2.1
4	CO4	2	2.48	2.09

Table B.8.4.2a

Direct and Indirect Attainment of COs for the considered courses in 2017-18

Course Name	Course Code	Level of Attainment	
		Direct	Indirect
Communication Skills and Oral Presentation	HSS-101	1.85	3
Physics-I	PHY-101	2.04	3
Chemistry-I	CHM-101	2.55	3
Mathematics-I	MTH-101	1.71	3
Engineering Drawing	CIV-102	1.64	3
Introduction to Social Sciences	HSS-201	2.4	3
Physics-II	PHY-201	1.54	3
Chemistry-II	CHM-201	2.68	3
Mathematics-II	MTH-201	2.0	3
Strength of Materials	CIV-201	1.91	3
Computer Fundamentals and Problem-Solving Techniques	IT-101	2.55	3
Workshop Practice-I	WSP-1	2.72	3
Physics Lab	PHY-102P	3.00	3
Chemistry Lab	CHM-101P	3.00	3
Computer Fundamental Lab	IT-1023	2.38	3
Machine Drawing	MEC-201	2.14	3
Computer Programming	Cse201	2.03	3
Workshop Practice-II	WSP-II	2.71	3
Physics Lab-II	PHY-202P	2.79	3
Chemistry Lab	CHM-201P	3.00	3
CSE Lab	CSE-202P	2.49	3

Table B.8.4.2b

Direct and Indirect Attainment of COs for the considered courses in 2018-19

Course Name	Course Code	Level of Attainment	
		Direct	Indirect
Communication Skills and Oral Presentation	HSS-101	2.53	3
Physics-I	PHY-101	1.00	3
Chemistry-I	CHM-101	2.49	3

Mathematics-I	MTH-101	2.10	3
Engineering Drawing	CIV-102	0.54	3
Introduction to Social Sciences	HSS-201	2.22	3
Physics-II	PHY-201	1.62	3
Chemistry-II	CHM-201	2.66	3
Mathematics-II	MTH-201	2.10	3
Strength of Materials	CIV-201	1.94	3
Computer Fundamentals and Problem-Solving Techniques	IT-101	2.55	3
Workshop Practice-I	WSP-1	2.75	3
Physics Lab	PHY-102P	2.77	3
Chemistry Lab	CHM-101P	3.00	3
Computer Fundamental Lab	IT-1023	2.36	3
Machine Drawing	MEC-201	1.36	3
Computer Programming	Computer	2.22	3
Workshop Practice-II	WSP-II	2.79	3
Physics Lab-II	PHY-202P	2.70	3
Chemistry Lab	CHM-201P	2.95	3
CSE Lab	CSE-202P	2.65	3

Table B.8.4.2c

Direct and Indirect Attainment of COs for the courses in 2019-2020

Course Name	Course Code	Level of Attainment	
		Direct	Indirect
Basic Electrical Engineering	EEL100	2.30	3
Basic English and Communication Skills	HUL100	2.76	3
Computer Programming	ITL100	2.20	3
Engineering Chemistry	CYL100	2.87	3
Engineering Drawing	CIP100	2.42	3
Mathematics I	MAL100	1.94	3
Basic Electrical Engineering Laboratory	ELP100	2.60	3
Chemistry Laboratory	CYP100	3.00	3
Computer Programming Laboratory	ITP100	2.90	3
Elements of Mechanical Engg.	MEL100	2.50	3
Engineering Physics	PHL100	3.00	3
Engineering Mechanics	CIL100	2.41	3
Advanced English Comm. Skills & Organizational Behavior	HUL101	2.68	3
Environmental Studies	CYL101	3.00	3
Mathematics II	MAL101	2.67	3
Language Laboratory	HUP100	2.08	3
Physics Laboratory	PHP100	3.00	3
Work shop Practice	WSP100	3.00	3

Table B.8.4.2d

8.5. Attainment of Program Outcomes from first year courses (20)

Claimed 18

Course Articulation Matrix with Correlation for the sample course HSS-101

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
HSS-101.CO1	To exhibit effective reading and writing skills.									2	3	2	
HSS-101.CO2	To use grammatical elements correctly.									2	2	2	
HSS-101.CO3	To produce project reports with efficient technical writing skills.									2	3	3	
HSS-101.CO4	To give effective oral presentation in English.									3	2	2	
	Average Value									2.25	2.5	2.25	
	Correlation									3	3	3	

Table B.8.5

8.5.1. Indicate results of evaluation of each relevant PO if applicable (10)

Claimed 10

8.5.1A Process of computing POs attainment level from the COs of related first year courses-

All the courses offered during 1st year have strong correlation with most of the POs. The process of collection of data and their analysis has been explained in earlier sections. The syllabus based Program Articulation Matrix for the first year courses is shown in Table. The Direct and In-direct Attainment Levels of Program Outcomes are calculated by making use of the formula (CO Attainment Level×CO Correlation Level)/3and tabulated in Tables. The overall Attainment Levels of Program Outcomes are calculated by giving 80% weightage to Direct Attainment Levels of POs and 20% weightage to In-direct Attainment Level of POs, in other words, we used the formula (0.8×Direct Attainment Level of POs+0.2×In-Direct Attainment Level of POs). The overall Attainment Levels of Program Outcomes are shown in Table

Overall Attainment Levels of Program Outcomes for 1st year courses (2017-2018)

Course Name	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO10	PO11	PO12
Communication Skills & Oral Presentation	HSS-101									1.5	1.6	1.5	
Physics – I	PHY-101	2.02	2.02	1.8	0.89	1.71	0.68						
Chemistry-I	CHM-101	2	1.2			2.2	2	2			1	1.5	1.25
Mathematics - I	MTH-101101	1.4	1.3	1.5	0.6	0.7	0.6	0.6	0.4	0.6	0.4	0.8	0.5
Engineering Drawing	CIV-102	1.63	1.63	1.63	1.63	1.09	1.09	1.09		1.63	1.633	1.09	1.09

Computer Fundamentals and Problem-Solving Techniques	IT-101	2.23	1.09	0.37		0.85							1.73
Workshop Practice-I	WSP-1	2.70	0.90	0.90		1.80	1.80	1.80	1.80	2.70	1.80		2.70
Physics Lab	PHY-102P	2.4	2.4	2.2	1.6	1.6	0.8	0	0	0.8	0	0	0
Chemistry Lab-I	CHM-101P	2	1.6	1.4	0	0	1.4	1.6	0	0	1.2	1.064	1
Computer Fundamental Lab	IT-1023	1.62	0.94	1.14		1.79							1.59
Introduction to Social	HSS-201			0.35			1.16	0.98	0.95	0.95	0.29	0.38	0.35
Physics – II	PHY-201	1.54	1.54	1.29	0.6	0.51				0.52			
Chemistry-II	CHM-201												
Mathematics - II	MTH-201	1.87	1.53	1.82	0.56	0.76	0.4	0.6	0.4	0.6	0.4	0.84	0.54
Machine Design	MEC-201	1.650	0.373	1.788	0.548	0.88	0.4	0.6	0.9283	0.76	0.4	0.6	0.369
Computer Programming	CSE-201	1.79	1.8	1.95	1.32	1.61	0.57	0.57	0.6	0.71	0.586	0.63	1.85
Workshop Practice-II	WSP-2	2.64	0.88	0.88		1.76	1.76	1.76	1.76	2.64	1.76		2.64
Physics Lab-II	PHY-202P	2.4	2.4	2.2	1.6	1.6	0.8	0	0	0.8	0	0	0
Chemistry Lab-II	CHM-201P	2	1.6	1.4	0	0	1.4	1.6	0	0	1.2	1.064	1
CSE Lab	CSE-202P	1.84	2.21	2.15	1.33	2.03	0.58	0.58	0.57	0.95	0.62	0.64	2.12
Strength of Materials	CIV-201	2.16	2.16	1.28	1.36		1.44	0.84					
Average Attainment		1.99	1.53	1.45	1.09	1.39	1.06	1.12	0.93	1.17	0.99	0.92	1.34

Table B.8.5.1a

Overall Attainment Levels of Program Outcomes for 1st year courses (2018-2019)

Course Name	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Communication Skills & Oral Presentation	HSS-101									1.88	2.15	1.93	
Physics – I	PHY-101	0.98	0.98	0.82	0.43	0.8	0.33						
Chemistry-I	CHM-101	2.3	1.2			2.2	2	2			1.3	1.8	1
Mathematics - I	MTH-101101	1.5	1.4	1.5	0.8	0.9	0.7	0.6	0.4	0.6	0.4	0.8	0.4
Engineering Drawing	CIV-102	0.91	0.91	0.91	0.91	0.611	0.611	0.611		0.91	0.856	0.611	0.611
Computer Fundamentals and Problem-Solving Techniques	IT-101	2.05	1.01	0.45		0.79							1.59
Workshop Practice-I	WSP-1	2.775	0.870	0.922		1.845	1.845	1.845	1.845	2.77	1.845		2.77
Physics Lab	PHY-102P	2.4	2.4	2.2	1.6	1.6	0.8	0	0	0.8	0	0	0
Chemistry Lab-I	CHM-101P	2	1.6	1.4	0	0	1.4	1.6	0	0	1.2	1.064	1
Computer Fundamental Lab	IT-1023	1.63	0.92	1.14		1.78							1.56
Introduction to Social Sciences	HSS-201			0.35			1.08	0.89	0.95	1.04	0.355	0.39	0.36

Physics – II	PHY-201	1.61	1.61	1.39	0.71	0.54				0.54			
Chemistry-II	CHM-201	1.8	1.4	1.6	1.2	0.8	0.8	1.86	0.8	0.8	1.6	0	1.4
Mathematics - II	MTH-201	1.93	1.58	1.84	0.7	0.88	0.4	0.6	0.4	0.6	0.4	0.81	0.5
Machine Design	MEC-201	1.3	0.3	1.3	0.4	0.9	0.4	0.6	0.7	0.9	0.4	0.6	0.3
Computer Programming	CSE-201	1.74	1.89	1.97	1.29	1.67	0.57	0.56	0.57	0.71	0.57	0.61	1.72
Workshop Practice-II	WSP-2	2.75	0.92	0.92		1.83	1.83	1.83	1.83	2.75	1.83		2.75
Physics Lab-II	PHY-202P	2.4	2.4	2.2	1.6	1.6	0.8	0	0	0.8	0	0	0
Chemistry Lab-II	CHM-201P	2	1.6	1.4	0	0	1.4	1.6	0	0	1.2	1.06	1
CSE Lab	CSE-202P	1.99	2.27	2.27	1.43	2.09	0.61	0.59	0.57	0.94	0.63	0.64	2.15
Strength of Materials	CIV-201	2.19	2.19	1.3	1.37		1.45	0.85					
Average Attainment													

Table B.8.5.1b

Overall Attainment Levels of Program Outcomes for 1st year courses (2019-2020)

S. No.	Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1.	EEL100	Basic Electrical Engineering	2.11	1.35	1.20	1.30	0.28	0.65					1.14	0.99
2.	HUL100	Basic English and Communication Skills						0.9			1.54	2.66	1.33	1.11
3.	ITL100	Computer Programming	0.75	2.2	2.3		2.3						1.5	1.5
4.	CYL100	Engineering Chemistry	1.96	1.95	1.94	0.82		1.23	1.79	0.97	0.82	1.37	1.63	2.11
5.	CIP100	Engineering Drawing	2.5	2.5	2.5	2.5	2.19	1.66	1.66	2.8	2.5	2.25	1.66	1.66
6.	MAL100	Mathematics I	1.22	1.08	1.27								0.35	
7.	ELP100	Basic Electrical Engineering Laboratory	2.3	2.16		1.625		2.41	1.91				2.16	
8.	CYP100	Chemistry Laboratory	2.15	1.98	2.04	0.81		1.33	1.98	0.81	0.81	1.54	1.75	2.29
9.	ITP100	Computer Programming Laboratory	2.2	2.1	2.1		2.2					1.6	1.6	1.5
10.	MEL100	Elements of Mechanical Engg.	2.45	1.63	1.75							1.63		2.45
11.	PHL100	Engineering Physics	2.9	2.838	2.713	1.3	1.1375	1.05			1			
12.	CIL100	Engineering Mechanics	2.26	2.22	1.36	1.64		1.29	0.64			1.91		2.77
13.	CYL101	Environmental Studies	2.67	2.42	2.91	0	1.69	2.66	2.91	0	0	1.94	1.45	2.27
14.	HUP100	Language Laboratory									0.99	2.13	1.01	0.67
15.	PHP100	Physics Laboratory	3	2.975	2.75	2.125	2.025	1			1			
16.	WSP100	Work shop Practice	2.92	0.97	0.97		1.94	1.94	1.94	1.94	2.92	1.94		2.92
17.	HUL101	Advanced English Comm. Skills & Organizational Behavior						1.2			1.43	2.63	1.27	0.96
18.	MAL101	Mathematics II	2.36	1.80	2.26								0.63	0.60

Table B.8.5.1c

8.5.2. Actions taken based on the results of evaluation of relevant POs (10)

Claimed 8

Academic Year : CAYm1 (2019-20) Attainment is set to be achieved if it is 70% CO-PO mapping (Target level).			
POs	Target Level (70%)	Attainment Level	Observations
PO1:	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.		
PO1	1.93	2.25	*Set target is achieved*
Action1: To organize practical classes to improve understanding of basic sciences Action2: To display animated videos on engineering fundamentals			
PO2:	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.		
PO2	1.6	2.01	*Set target is not achieved*
Action1: To write review of sample papers on basic and engineering sciences Action2: To give more tutorial problems to improve understanding of subjects			
PO3:	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.		
PO3	1.7	2	*Set target is not achieved*
Action1: The students are encouraged to participate in social and cultural activities Action2: To provide more practice of complex engineering problems Action3: To organize visits to industry to get familiar with engineering problems and solutions			
PO4:	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.		
PO4	1.43	1.35	*Set target is not achieved*
Action1: Assigned some extra problems to students and asked them to solve in tutorial class to facilitate deeper understanding of the subject. Action2: Encouragedto participate in seminars and presentations. Action3: Enhanced the visualization capabilities through pictures, prototypes and tools.			
PO5:	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with a understanding of the limitations.		
PO5	1.55	1.72	*Set target is achieved*
Action1:To conduct virtual classes and use ICT tools in classroom teachings Action2:Students are encouraged to use simulation software to understand modeling of problems			
PO6:	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.		

PO6	1.24	1.44	*Set target is achieved*
Action1:Students are encouraged to participate in cultural and societal activities Action2:To motivate the students to join different activities on societal and health issues			
PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7	1.52	1.83	*Set target is achieved*
Action1: Students are exposed to the concept of sustainable development			
PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	0.93	1.3	*Set target is achieved*
Action1: Students are motivated to understand and follow the professional ethics			
PO9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO9	1.32	1.3	*Set target is achieved*
Action1: Students are encouraged to participate in group activities as member or leader.			
PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	1.65	1.96	*Set target is not achieved*
Action1: Seminars are organized and presentations are made using audio-visual tools. Action2: Students were asked write report on certain topics in science and humanities. Action3: Enhanced the visualization capabilities through pictures, prototypes and tools.			
PO11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.			
PO11	1.29	1.34	*Set target is not achieved*
Action1:Team works are organized, students participated as a member or team leader Action2:Assigned projects and presentations in the field of science and humanities			
PO12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.			
PO12	1.45	1.72	*Set target is not achieved*
Action1: The students are motivated to educate themselves about changing technological environment			

Table B.8.5.2

CRITERION 9	Student Support Systems	50
	Marks Claimed	50

9.1 Mentoring system to help at individual level (5)

Claimed 5

❖ **Mentoring System**

A new strategy to access and motivate students has been initiated. All faculty and students of all semesters are divided into mentor-mentee. Semester coordinator will be assigned as mentor for each class. They would look into assigned student's academic progress, discuss with tutor and other faculty about their behavior in classroom and should observe any unusual behavioral patterns and incidents.

❖ **Mentoring at NIT Srinagar**

- Mentoring of the students is our top priority. Each teacher takes keen interest to mentor students under their charge.
- Student Welfare Cell's members are always available to heed to the problems of the students. Students are always free to approach the teachers for any kind of guidance-personal, professional and so on. Students come with a burden and special endeavors are made to see that they get relieved of the burden.
- The students visit Students Welfare Centre where a lecturer (member of student Welfare) is made available throughout the day. Teachers come to the cell in their free periods. They counsel the students on diverse issues ranging from some personal psychological to social and academic.
- A diary shall be maintained for each student where various details like Personal Information, Previous meeting details, Academic Performance, Competitive Examination Details etc are recorded. The mentors meet the students periodically and monitor their performance and their activities. Guidance regarding the lagging issues is provided. If need be occasionally a meeting with the parents will be conducted.

❖ **Professional Guidance**

The departments are well equipped with knowledgeable human resources in the form of members of faculty who by keeping themselves updated of developments offer guidance to the prospective professionals in addition to the classroom teaching.

➢ **Career advancement**

The Training and Placement cell has been active not only in arranging campus recruitment drives, but also offering awareness and training for the students.

➢ **Course work**

Members of faculty handling different courses interact with students in clearing all their Concept-oriented and test-based mechanics of the respective courses. The teachers after first formal evaluation guide the students as far as student-specific gray areas are concerned.

➢ **Lab-specific**

Each of the lab sessions are handled by 2 teachers along with 2 to 3 non teaching staffs, in order to have special care for the students while experiments are being handled. A demonstrative presentation is given by the teacher concerned before every experiment. The Laboratory records are evaluated after the experiment is held. In other words, there is active involvement of the members of faculty in pre-experiment stage, at the time of experiment and after the experiment.

➢ **Efficacy of the System**

- The mentoring system developed by the Institute has been proved to be effective considering different parameters.
- The involvement of students in the academics has increased, like class work attendance, paper presentations, presentation of models in exhibitions, participation in cultural activities etc. Because the number of students allocated to each of the mentor is limited to one class, personal interaction on regular basis has been possible.

❖ **Specific Support Services/Facilities Available**

➢ **Support for "Back Loggers"**

Remedial classes have been initiated through a special drive for students with back logs. These classes are engaged by Students of higher semesters with outstanding performance in the given course for the students having backlog in that very particular course.

Slow learners are found out from the analysis of various assessment processes such as class test, continuous assessment test, lab viva session, interaction during the lecture delivery, and in mentoring session etc. These students are asked to discuss with the faculty in person during the extra hours such as Tutorial/Library/seminar hour/ Remedial Classes during evening stay back, in addition to the special classes conducted for those students. Slow learners are also asked to take up the retests for the respective subjects. They are also given special attention by solving the important problems in the form of additional worksheets and assignments.

- **Exposures of students to other institution of higher learning / corporate / business house etc.**

The students are exposed to the current trends in the industry by arranging guest lecture from the reputed institution and industries. The students are also encouraged to take up the in-plant training in the industry to get the hands-on experience about the current technology in the industries. The institute arranges for industrial visits to the students to get first hand information about the industries and their technologies.

- **Alumni connect**

Alumni of the Institute have been involved very actively in the process of Career advancement of the current students. Our Distinguished Alumni have been very proactive and deliver Lectures regarding student requirements of career building. Every month Alumni with varying expertise in industry, academia and successful entrepreneurship achievements are invited to have face to face interaction and deliver lectures related to their specific areas.

- **Memorandum of Understanding (MOU's)**

MOU's with IIT Delhi and IIT Jammu have been signed for facilitating project work, Research and even earning of credits during the stay of the student at these institutes of higher learning. Facilitation of placement to be carried out at these campuses has also been agreed on.
For regular internship/training of students in current niche areas, a MOU has been signed with ALTTC Ghaziabad, a BSNL concern which basically meant for imparting training to ITS candidates.

- **Skill development (Spoken English, Computer Literacy, etc.)**

The language laboratory helps to improve the communication skills of students. The students are encouraged to give seminars to improve their communication and public speaking skills. Skill development is imparted to the students through Training and placement cell as well as Language department. Many activities like soft skills, communication skills, guidelines to access online materials, multimedia-based learning, etc are carried out for the sake of students. This is being upgraded to make it state-of-the art.

Language Laboratory	Space, Number of Students	Software used	Type of Experiments	Qualityof Instruments	Guidance
1	300 Sft 30/shift	Internet support	Speaking, Listening, Reading	Good	Yes

Table B. 9.1a

- **Student's grievances redressal**

Grievances should be presented in person and in writing before the Coordinator, HOD or Director. The concerned authority shall make an effort to solve the problem and redress the grievance informally but if he does not succeed in this, a grievance committee shall be formed, the composition of which shall depend on the grievance. The committee shall look in to the grievance objectively and having due regard to the rules and the institutional and academic goals, recommend appropriate action to redress the grievance.

- **Women Grievance Committee**

Complaints Cum Redressal Committee for women is headed by Prof. Rohie Naaz Mir, HOD CSE department with additional members. If any of the girl students or lady faculty/staff faces a problem related to sexual harassment, they can report to the above committee. We have not received any such complaint for the past few years.

- **Anti-ragging committee**

Anti Ragging committee headed by Dean Students Welfare, Wardens and Hostel manager is in place since long. Sign Boards have been put up specifically for this purpose all over the campus with strict warnings of not indulging in any such activity which would be considered as Ragging. Anti ragging information leaflets are distributed to all first-year students on their first day in the Institute. Anti ragging measures are taken in the Institute campus, hostels and Institute buses.

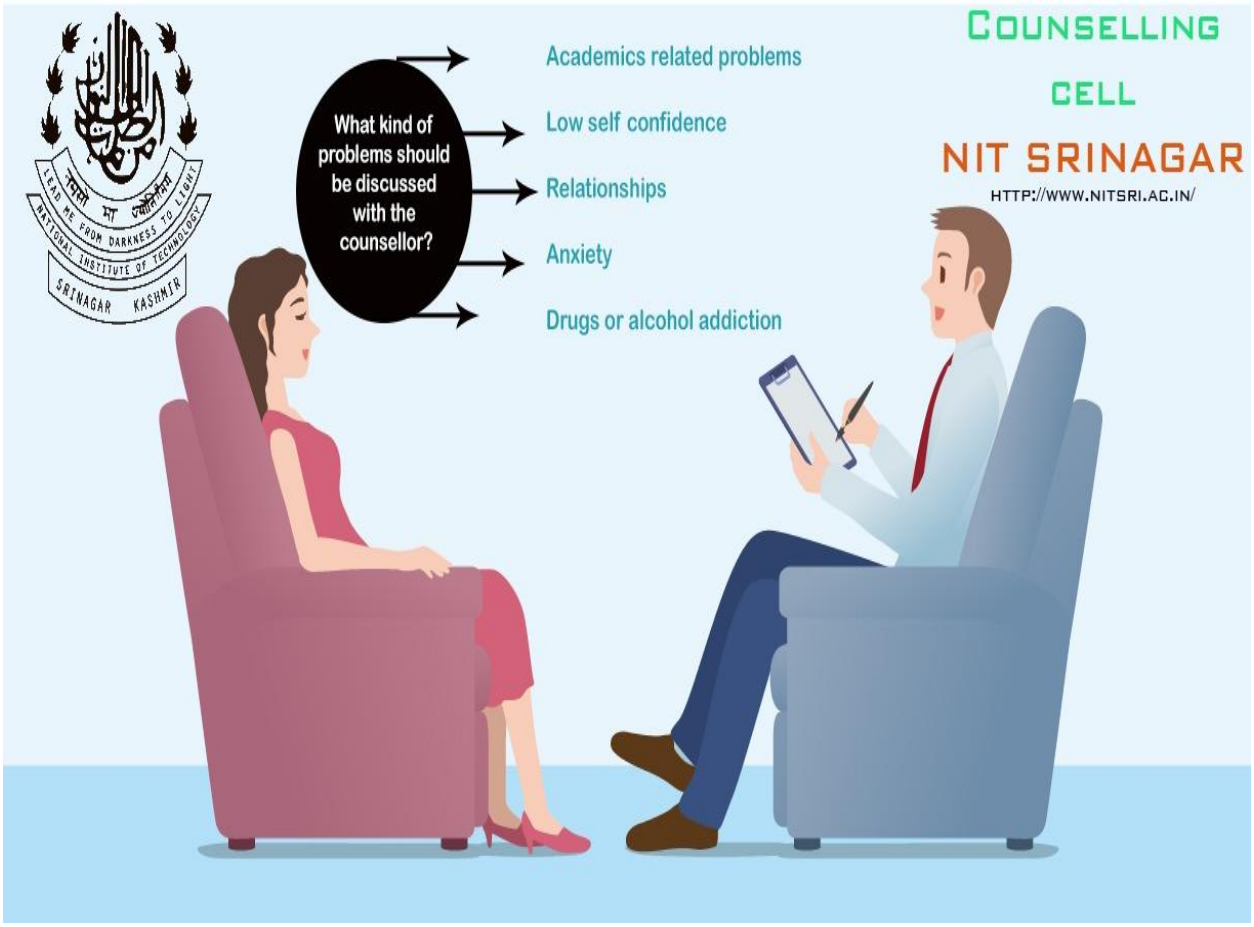
- **Counselling Cell At Nit Srinagar**

1. Introduction: -

Counselling is a process that seeks to help you focus on and understand more clearly the issues that concern or trouble you. The counsellor's role is to offer support and understanding and listen and respond in a non-judgmental way. Counselling can also help with making decisions, choices or changes that are right for you. It helps you to understand your problem more deeply and deal with it more efficiently. The general problems associated with students are:

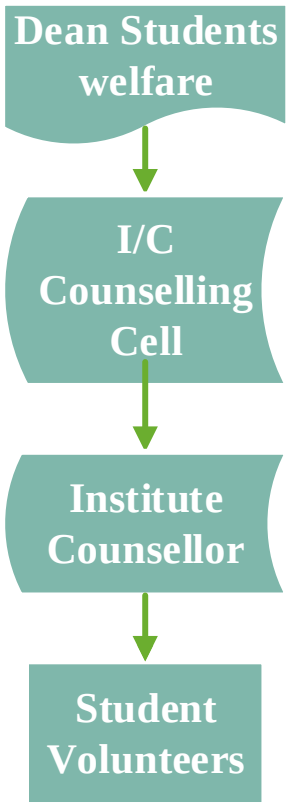
- Time management
- Low self-confidence
- Academics related problems
- Problems related to peers
- Emotional stress
- Relationships
- Family issues
- Financial problems
- Decisions regarding career

- Adjusting to the new environment
- Homesickness
- Sleep disorders
- Loneliness
- Anxiety
- Time management



According to World Health Organization, nearly one among five students will have emotional or behavioural problems. So, the mental health and wellbeing of students require our attention. In this regard, Honorable Director Prof Rakesh Sehgal of the National Institute of Technology Srinagar has taken the initiative of providing counselling to students to make them more productive through programs of awareness on Mental health issues and professional counselling services. NIT Srinagar has a counselling cell which deals with all these issues of the students. It works under Dean Student's welfare and has an in-charge counselling cell, institute counsellor (psychologist) and student volunteers of the cell.

2. Structure of counselling cell: -



- Dean Student's Welfare: - Prof. Abdul Liman
- In charge Counselling cell: - Dr. Neeraj Gupta
- Counsellor (psychologist): - Mr. Fairoz Malla
- Student Volunteers (List Attached- the same selected student Volunteers are continued)

The work of the in-charge counselling cell is to coordinate the activities and events of the counselling cell. NIT Srinagar has a full-time counsellor who is available 24 hours to deal with the issues of low self-confidence, emotional stress, sleep disorders, loneliness, anxiety etc. The student volunteers assist in various activities like conducting events, identifying the students under stress, counsel them regarding academic issues, time management etc.

3. Volunteers of Counselling Cell: -

Student Coordinator (Girls): - Riya Baranwal

- **Student volunteers for academics related problems** (Low self-confidence, Financial problems, Decisions regarding career, Time management).

S. No.	Name	Year of Enrollment
1	VIBHUTI CHOUDHARY	2018
2	SACHI SINGH	2017
3	RIYA BARANWAL	2017
4	JASAFA SHOWKET	2017

Table B.9.1b

- **Student volunteers for Emotional stress** (Problems related to peers, Relationships, Family Issues, Adjusting to the new environment, Homesickness, Sleep disorders, Loneliness, Anxiety)

S. No.	Name	Year of Enrollment
1	SHALINI PATHAK	2018
2	PRITI KUMARI	2017
3	ANEESA KHAN	2018
4	BABRA ABBAS	2018

Table B.9.1c

Student Coordinator (Boys): - Sahib Dawood

- **Student volunteers for** a**cademics related problems** (Low self-confidence, financial problems, Decisions regarding career, Time management).

S. No.	Name	Year of Enrollment
1	ABRAR SHAKEEL	2017
2	SAHIB DAWOOD	2017
3	ABDUL KASHIF	2017
4	ANURAG TIWARI	2018
5	SHIVANSHU TRIPATHI	2018

Table B.9.1d

- **Student volunteers for Emotional stress** (Problems related to peers, Relationships, Family Issues, Adjusting to the new environment, Homesickness, Sleep disorders, Loneliness, Anxiety)

S. No.	Name	Year of Enrollment
1	FAISAL JABAR	2017
2	MOHAMMAD SHOAIB	2017
3	MUZAMMIL RAFIQ	2017
4	ROHIT KUMAR	2017
5	AMAN YADAV	2017

Table B.9.1e

- **Student volunteers for Drug-Related issues**

S. No.	Name	Year of Enrollment
1	NADEEM AKHTER	2018
2	DEEPAK MEENA	2018
3	ROMAN WANI	2017
4	MOHAMMAD ZUBAIR	2017
5	NAVEED MAQBOOL	2017
6	NADEEM AKRAM	2017

Table B.9.1f

4. Various activities of counselling Cell: -

a) Team of volunteers: -

The students are more comfortable discussing the problem in the same age group. So, a team of volunteers from the students has been formed. These volunteers are trained every 15 days to deal with the issues of students.

b) Workshop on "How to manage stress".

On 20th May 2019, a workshop on "How to manage stress" organized by Counselling Cell NIT Srinagar. The workshop was conducted by institute counsellor Mr. Fairoz and Mr. Hussain, mental health therapist. The session was coordinated by Dr. Neeraj Gupta, Assistant Professor, Department. of Electrical Engineering. The counsellors started with defining stress, its causes, effect on life. Various activities were conducted like relaxation exercises, free association, mindfulness and deep breathing to relieve stress. Additionally, Mr. Shankar, head of ADANI automation, shared his life experiences and motivated students towards study.


Letz Begin with an EXE


Workshop On


BARRIERS OF SEEKING HELP


CTION BETWEEN MIND
AND BODY


Workshop On


COUNSELLING CELL NIT SGR
IS ORGANISING
Workshop On
HOW TO MANAGE STRESS?
In Collaboration with

c) Team of student volunteers for the new batch of students (2019): -

To help the new batch of students to cope with stress, a team of student volunteers has been set up to deal with **Academic related issues** (Low self-confidence, Decisions regarding career, Time management), **Emotional stress** (Problems related to peers, Relationships, Family Issues, Adjusting to the new environment, Homesickness, Sleep disorders, Loneliness, Anxiety).

S. No.	Name	Year of Enrollment
1	VIBHUTI CHOUDHARY	2018
2	SACHI SINGH	2017
3	RIYA BARANWAL	2017
4	SHALINI PATHAK	2018
5	PRITI KUMARI	2017
6	SAHIB DAWOOD	2017
7	ABDUL KASHIF	2017
8	ANURAG TIWARI	2018
9	SHIVANSHU TRIPATHI	2018
10	ROHIT KUMAR	2017
11	DEEPAK MEENA	2018
12	ROMAN WANI	2017
13	MOHAMMAD ZUBAIR	2017
14	NADEEM AKRAM	2017
15	FAISAL JABBAR	2017

Table B.9.1g

d) Banners displayed on campus by Counselling cell: -

Banners with phone numbers of counsellors and student volunteers are displayed at various location on the campus so that any stress-related issues can be reported and resolved.

e) Frequent Visits to Hostel for awareness programs.

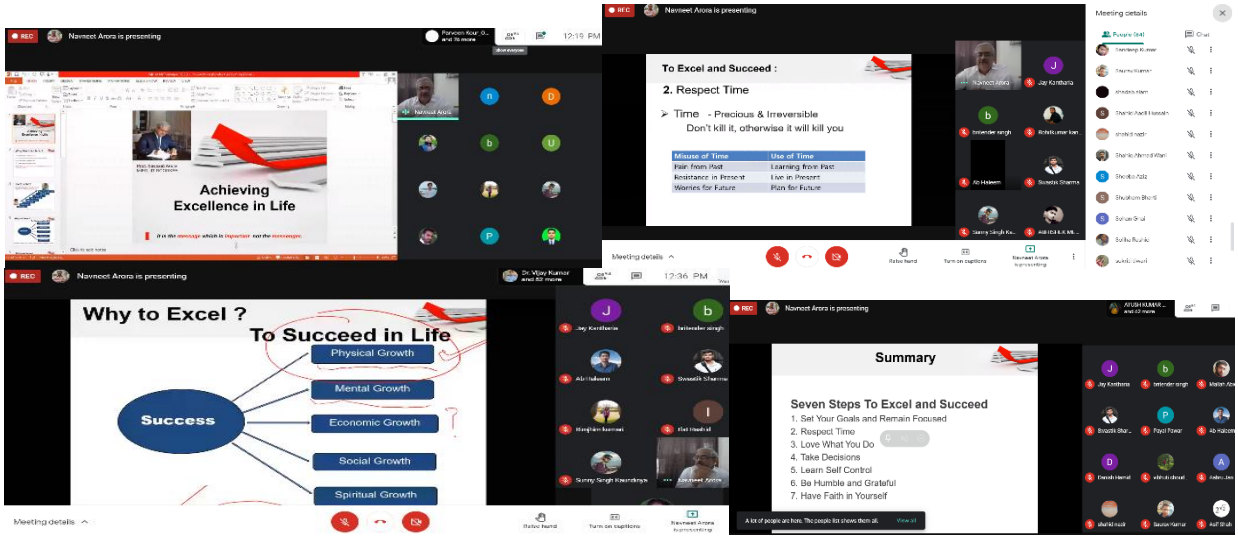
Another initiative was taken according to the instructions given by the Honorable Director to visit Hostels of the institute with the sole aim to aware students about fundamental Mental health issues and the impact of such issues on quality of life; and also, to promote open discussions on Mental health problems and positive mental wellbeing. Accordingly, visits were paid to some of the hostels and students were made aware of the mental health and stress management techniques. The counselling cell and Medical Unit is working hard to provide primary health care, awareness programs and psycho-social support to Students of the institution.

f) Motivational Talk series: -EMIT Talks-I

On 21st November 2020, The Counselling Cell of the Institute has initiated a Talk Series titled "EMIT", an acronym for "Entrepreneurs, Motivators, Innovators, Technocrats", who will be the invitee for these talks. The first invitee of the talk was Prof. (Dr.) Navneet Arora from Mechanical Engineering Department of IIT Roorkee.

The maiden session was inaugurated by the Director, Prof. (Dr.) Rakesh Sehgal. He expressed his delight at the inauguration of this event and stressed the need for such talks to keep the students motivated and enthusiastic.

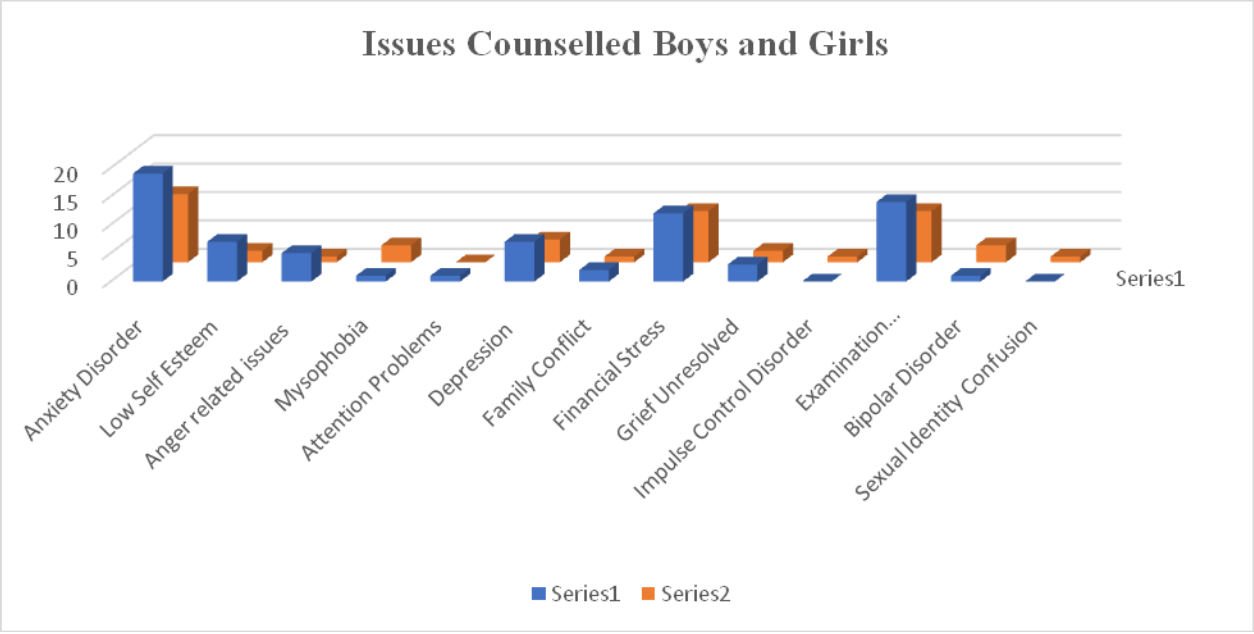
The speaker, Prof. Navneet Arora, focused on the 7 steps to excel and succeed viz. Setting goals, Valuing Time, Loving the work, Decision-making, Self-control, Humility, and having faith in oneself. The informative talk came to an end with an interactive Question answer session.

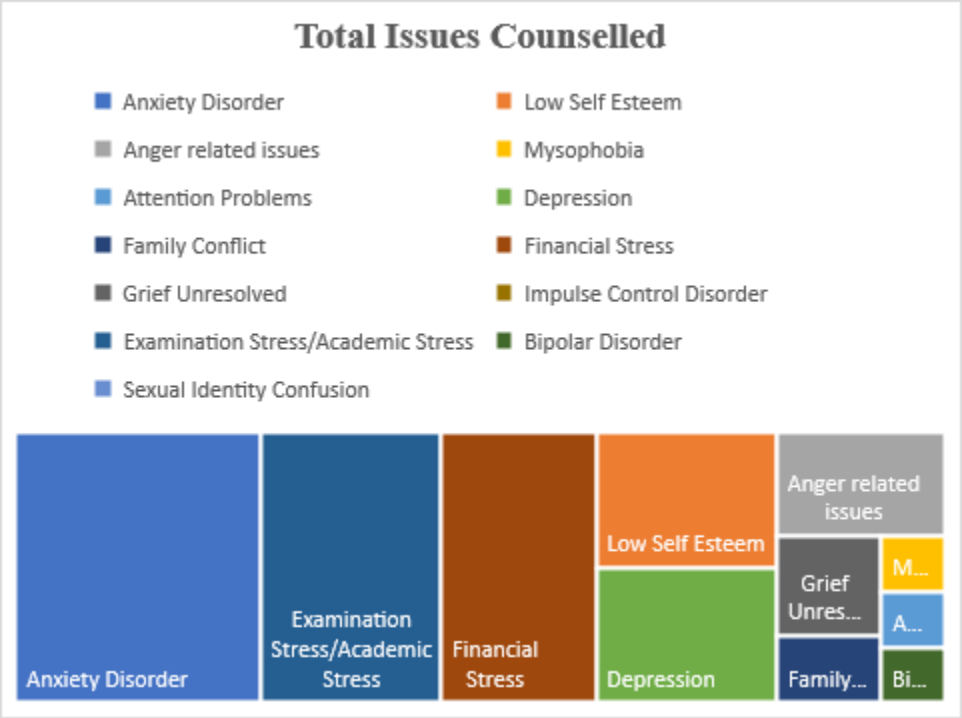


5. **Number of students counselled under various heads by Counselling Cell (upto session 2019-2020): -**

S.NO	ISSUES COUNSELLED	NO. OF STUDENTS	
		Male	Female
1	Anxiety Disorder	19	12
2	Low Self Esteem	07	02
3	Anger related issues	05	01
4	Mysophobia	01	03
5	Attention Problems	01	0
6	Depression	07	04
7	Family Conflict	02	01
8	Financial Stress	12	09
9	Grief Unresolved	03	02
10	Impulse Control Disorder	0	01
11	Examination Stress/Academic Stress	14	09
12	Bipolar Disorder	01	03
13	Sexual Identity Confusion	0	01

Table B.9.1h





6. Measures taken for emotional well being of students during pandemic: - Tele conselling has been done for various students during pandemic.

❖ Industry – Institute Interaction Cell at NIT Srinagar

The functions of Industry – Institute Interaction Cell of NIT Srinagar is to create adequate facilities of updating knowledge of professional engineers to meet the growing and developmental needs of the industry and to coordinate the research and developmental activities of the two systems. The cell is headed by Prof. Saad Parvez.

➢ Center for Research and Development/ Consultancy

- Provide technical assistance to industries and user Organizations/Departments
- Promote research and develop appropriate technology
- Promote exchange programmes between industries and the institution
- Support Short-term courses/Seminars/Workshops for effective dissemination of knowledge
- Establish testing/consultancy centres in various fields of engineering
- Extend the necessary assistance to Staff to attend National/International conferences, Seminars, Workshops etc.

Corporate social responsibility:

Local Schools have been adopted to bring their students under the direct tutelage of our institute and invite them on occasions so as to instill in them confidence and inspire them with what different branches of engineering mean to the world at large. It gives them an opportunity to visit our labs and to have ample knowledge about engineering as a choice for carrer. Our faculty and students are invited by these schools to have a strong bond of belonging and Big other relation.

9.2 Feedback analysis and reward / corrective measures taken (10)

Claimed 10

Feedback mechanism is a well-organized system in the institute. The system of feedback collection is being done by manual. Students can enter their feedback according to a questionnaire. HOD will analyze the feedback of each faculty and will take necessary actions.

An overview of feedback evaluation for faculty members

S.No.	Item	Response
1	Feedback collected for all courses	YES
2	Specify the feedback collection Process	One regular class hour is designated for the purpose.
3	Who collects the feedback	Faculty members in charge of Student Feedback
4	When feedback is collected	Around 12 weeks after semester commences
5	Percentage of students Participating	All students
6	Basis of reward / corrective measures	Faculty members who get a feedback below a pre-defined value are forwarded to higherauthorities for corrective actions.

Table B.9.2a

Flowchart for Feedback Analysis Process for Faculty Members

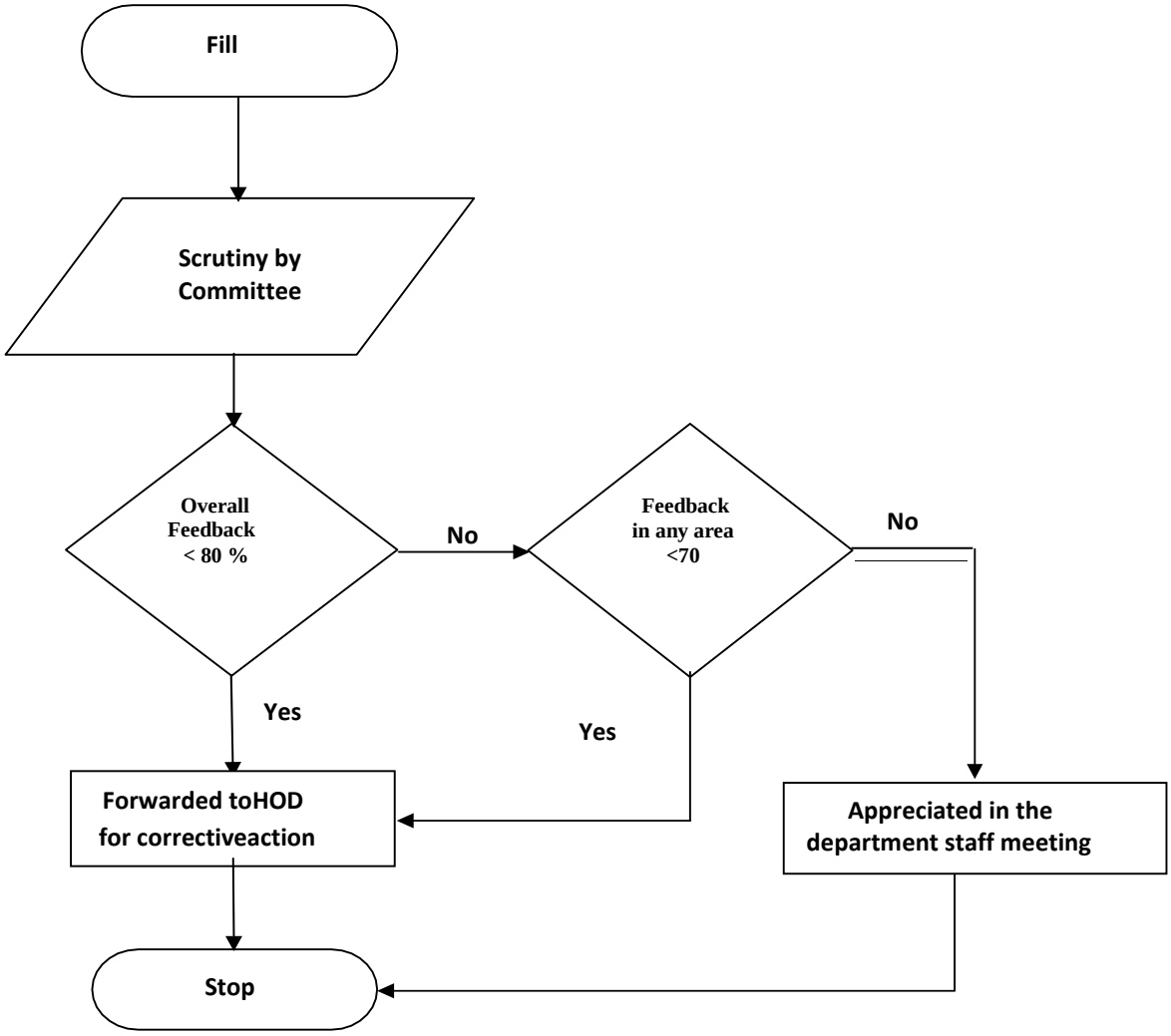


Figure B.9.2a

Basis of reward / corrective measures, if any:

Once HOD gets the summary of feedback, HOD analyzes the feedback of each faculty and will take necessary actions. The procedure of corrective action is given in the flow chart

Flowchart for checking effectiveness of corrective action

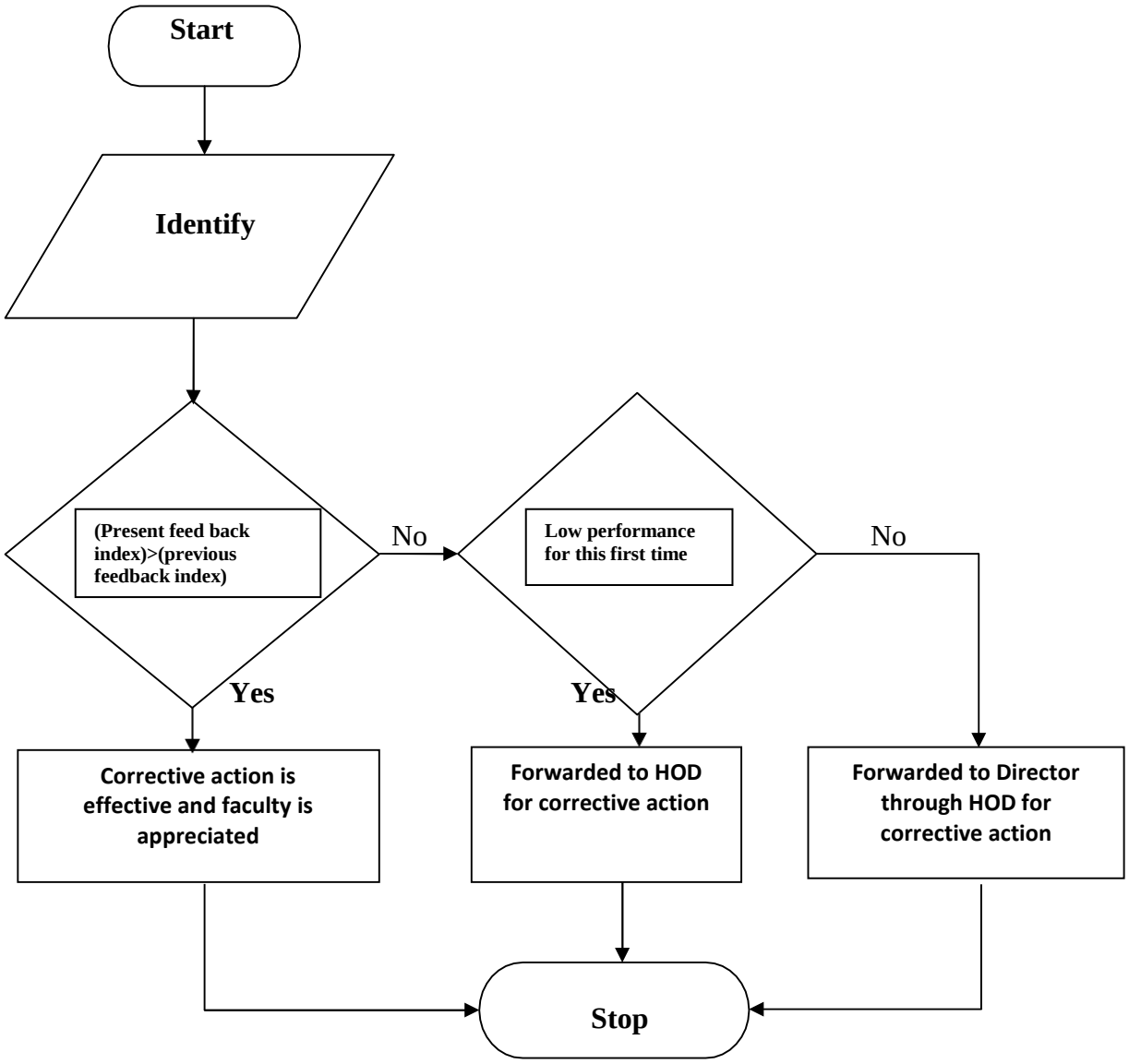


Figure B.9.2b

Induction programs are conducted for newly joined faculty members and continuing education programme for the experienced faculties. Those teachers who have not obtained good appraisals have a detailed discussion with the HOD on how to improve the teaching. Level of feedback is taken into account while evaluating the staff for promotion.

Also, Class Committee meeting shall be conducted twice in every semester for each class. Committee members includes, Head of the Department, Class Tutor, two faculty members

teaching in the respective class, 2-5 student members from the class. Students are given freedom to raise any kind of issues related to teaching learning process, facilities provided or any other relevant matter.

Feedback analysis and reward /corrective measures taken for Hostels and Messes

The hostel/mess management has taken the following corrective measures:

i. Conversion of messes from outsource to insource. It has been done to provide hygienic and quality food to the resident students.
ii. Inclusion of student representatives in Mess Management committees for receiving frequent feedback from the respective mess representatives about the quality of food/services being provided in the messes.
iii. Security personnel's have been deputed in each block/floor of the hostel to keep 24 x 7 vigil on the students to avoid any untoward incident, ragging etc.
iv. Engagement of Electricians, Carpenter & Plumber on contractual basis exclusively for hostel maintenance and repairing to redress the student problems without any delay.
v. Procurement of electrical/carpentry/plumbing/water purifier items by the management directly for speedy redressal of problems.

9.3 Feedback on facilities (5)

Claimed 5

Process of Feedback Evaluation

Institute has initiated taking feedback on facilities from the final year students. A feedback on Library facility, Training & Placement facility, Laboratory facility, general facility etc has taken from students and they are asked to give rating of the same as Excellent, Good, Average. Just like the faculty feedback, facility feedback shall also be automated. By using the feedback, the areas of improvement can be identified.

Feedback Template

Library [tick mark in the relevant cell]

Questions			
1. How often do you visit the Library?	Regularly	Occasionally	Rarely
2. Are the required number of titles in your subject available in the Library?	Excellent	Good	Average
3. Are you satisfied with the cataloguing and arrangement of books in the Library?	Excellent	Good	Average
4. Are you satisfied with the available reading space in the Library?	Excellent	Good	Average
5. Are the Library Staff co-operative and helpful?	Excellent	Good	Average

Table B.9.3a

Common Computing Center [tick mark in the relevant cell]

1. Are you able to access Internet Centre as and when you require?	Regularly	Occasionally	Rarely
2. Are you making use of educational online resources?	Regularly	Occasionally	Rarely
3. Are there enough number of nodes available in the Internet Centre?	Excellent	Good	Average
4. Are the net centre staff co-operative and helpful?	Excellent	Good	Average

Table B.9.3b

Training & Placement Cell [tick mark in the relevant cell]

1. Has the Training & Placement (T & P) Cell providedampleOn-campus placement opportunities?	Excellent	Good	Average
2. Has the (T&P) Cell provided sufficientOff - campus placement opportunities?	Excellent	Good	Average

3. Did you ever avail Career counseling and guidance for higher studies from T&PCell?	Excellent	Good	Average
4. If you are invited to deliver a guest lecture/a special talk/amotivational session for your juniors, will you beinterested?	Highly Acceptable	Acceptable	Likely
5. Would you like to join the Department/Institute AlumniAssociation?	Highly Acceptable	Acceptable	Likely

Table B.9.3c

Others[tick mark in the relevant cell]

1. Are the class rooms clean?	Excellent	Good	Average
2. Are the toilets cleaned properly?	Excellent	Good	Average
3. Are you provided with enough drinkingwater?	Excellent	Good	Average
4. Are you happy with the food served inthe present canteen?	Excellent	Good	Average
5. Are theactivitiesofthestudentcounseling center helpful to you?	Excellent	Good	Average
6. Do you think that your grievances areaddressed effectively and efficiently?	Excellent	Good	Average
7. Are you satisfied with the activities of"R&D, NSS, IEEEandother professional bodies" in our Institute?	Excellent	Good	Average
8. Are you able to make use of reprography facility in the Institute?	Excellent	Good	Average
9. Are you satisfied with the prevailingscholarship programme of our Institute?	Excellent	Good	Average

Table B.9.3d

Feedback on Lab Facilities

Title of Lab			
What was your batch size?			
Satisfied with your batch size?	Excellent	Good	Average
Experiments of lab classes conducted as per scheduleprovided?	Excellent	Good	Average
Equipment's provided sufficient?	Excellent	Good	Average

Equipment's provided in working condition?	Excellent	Good	Average
Lab consumablesprovidedof good quality?	Excellent	Good	Average
No. of experiments conducted asper University Norms?	Excellent	Good	Average
No. of experiments conducted over and above University Syllabus?	Excellent	Good	Average
Advanced/design-based experiments carried out in the lab?	Excellent	Good	Average
Lab manual provided was complete in covering the syllabusand informative?	Excellent	Good	Average
Lab assistant / technician assisting you?	Excellent	Good	Average
Lab in-charges(faculties)are helpful in completing the experiments?	Excellent	Good	Average
Opportunity provided to complete experiments partially doneexperiments and for days on whichstudents were absent.	Excellent	Good	Average

Table B.9.3e

The identified weaker areas, with corrective action plan are submitted to the management and the same can be corrected within one academic year and then the feedback is taken from the next final year students.

Process flowchart for feedback analysis on facilities

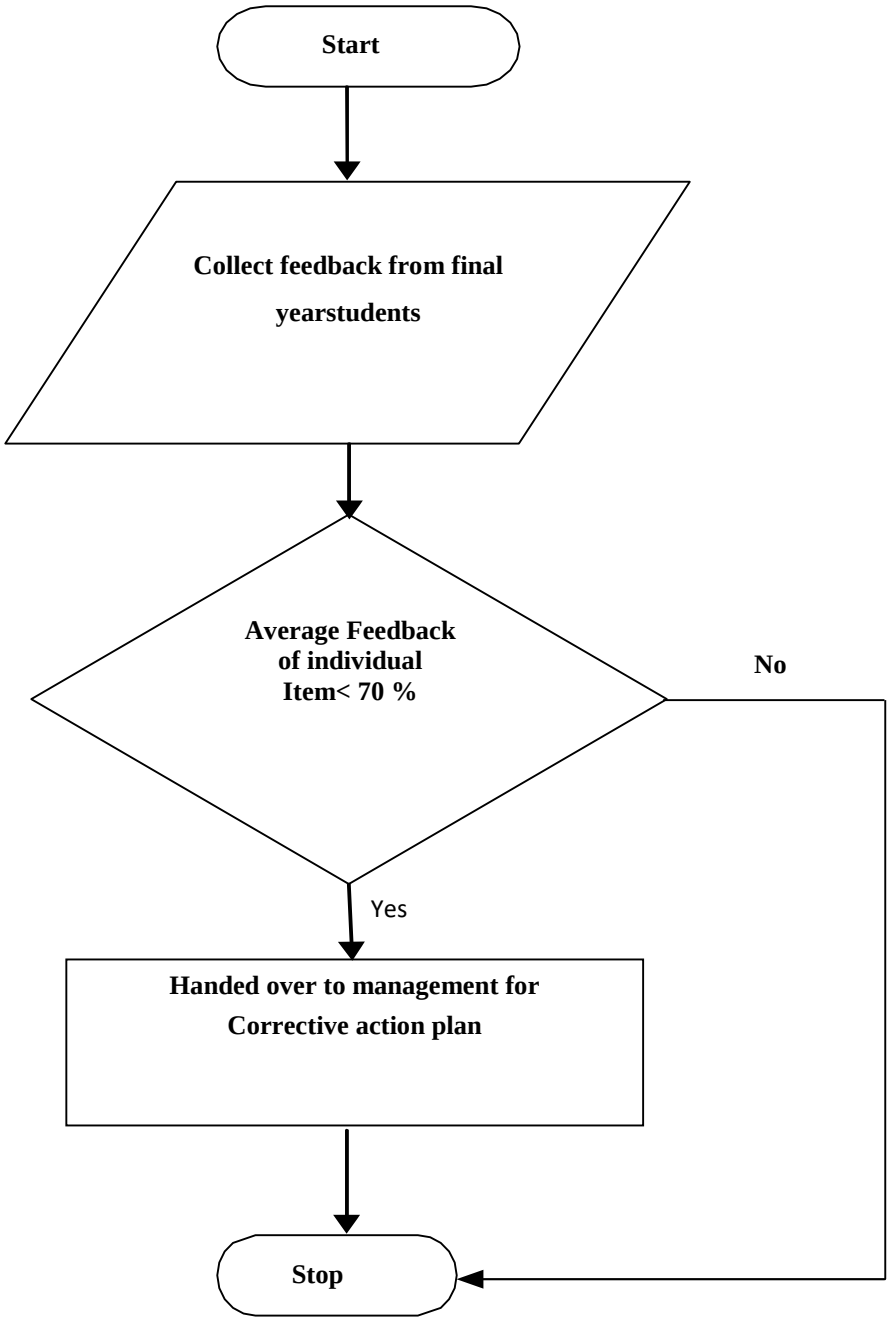


Figure B.9.3a

Information regarding Feedback on Facilities

The Hostel Management is providing the following facilities to the resident students of the Institute. Upgradation of facilities is in process as well as in pipeline.

S. No.	Particulars	Facilities Provided/Upgraded/In Pipeline
01.	**Community Services**	Students are being facilitated with funds for community services to induce social fabric & communal harmony in them as under: i) Erection of tent in the premises of hazratbal shrine on the eve of Eid-e-Milad-un-Nabi (Commemoration of birthday of Prophet Muhammad PBUH) and facilitating the devotees with water/juice or even with tea depending upon the season. ii) Erection of tent in the premises of Chatti Padsha on the eve of Guru Gobind Singh's Birthday, Guru Hargobind Singh's Birthday etc. and facilitating the devotees with kheer, sweets etc. iii) Erection of tent in the premises of Kheer Bhawani on the eve of mela to facilitate the devotees with kheer, sweets etc
02.	**Hostel Facilities**	
	i) Water Purifiers	Water Purifiers have been installed in sufficient numbers in each block of the hostel to facilitate the student community with purified water supply.
	ii) Furniture	New furniture is been procured i.e. lockers, beds and tables to facilitate the students with requisite furniture to make their stay in the hostel comfortable.
	iii) Wifi/LAN	Each block/wing of the hostel has been connected with wifi/LAN.
	iv) Parks and Lawns	Hostel Management has developed & beautified parks and lawns so that students can have leisure during their off time. Furthermore, umbrellas have been installed in the parks to facilitate the student community.
	v) Badminton Court	Badminton court has been constructed in each hostel of the Institute.

03.	**Up gradated facility**	
	i) Laundry facility	The Hostel Management has procured commercial washing machines to facilitate the student community with washing facility. The facility will be commenced soon.
	ii) Construction of hostels	The Institute has constructed two prefabricated hostels so that occupation of rooms could be minimized to some extent. The hostels will be allotted to the students soon.
	iii) Modernization of Messes	Each mess of the Institute has been modernized with latest kitchen equipments i.e. rice steamers etc.
04.	**In Pipeline**	
	i) Static Tent Structures	Erection of static tent structures work is in progress for facilitating the students with Guest Lobby, Reading Room, Library, Food Court etc.
	ii) Water Treatment Plant	Construction of mini water treatment plant in the hostel premises.
	iii) Mopping Scooter/Jet Cleaners etc	Procurement of mopping scooters and latest sanitation equipments to modernize the sanitation services in the Institute as well as in the hostels.
	iv) AC	AC's will be installed in each of the hostel.
05.	**Financial Assistance**	The Institute is providing financial assistance to the needy students every year so that they can continue their studies.

Table B.9.3f

CENTRAL FACILITIES

Central Workshop

- Workshop is Central Facility of the Institute.
- The primary objective of the establishment of Central Workshop is to conduct the classes of one of the main practical oriented course **"Workshop Practice"** to fulfill the basic requirement of B. Tech course.

Main Objective

Central Workshop caters to various activities of the Institute which includes:

- Engages the classes of practical oriented course of workshop practice in 1st and2nd semesters for (All) B. Tech courses.
- Provides facility to carry out practical's in various engineering trades to Mechanical and Metallurgical students.
- Plays an important role to design, development and fabrication of project works of the students from various departments of the Institute.
- Project work related activities including fabrication for the M. Tech students and Ph. D Research Scholars of the Institute.

Extension of Workshop Facility to other Technical Instutions in the Region

The following instutions are benefitted:

- College of Engineering and Technology University of Kashmir, Hazratbal Srinagar
- Government Polytechnic for Women, Bemina Srinagar
- North campus, university of Kashmir Baramulla
- I.T.I Srinagar
- Islamic University Awantipora Kashmir
- Government Engineering College of Technology, Safapora Kashmir

Technical Aid and Fabrication to Industries

Facilitating the technical aid to the **Small-ScaleIndustries of Kashmir** Province in the shape of fabrication of various types of Tools Dies and Jigs and Fixture and Gears etc.

Infrustructure

Well established Technical Infrastructure is available which includes:
(i) Machine (ii) Equipment (iii) Tools (iv) Technical Manpower

Workshop Practice provides facilities to be students for "hands on" various practical oriented tasks through formal classes /project works. The students are introducing to process, tools and materials for accomplishing various tasks which culminate in final products.

The students are trained to acquire basic knowledge and skills about engineering materials, manufacturing practices, equipment, tools and safety precautions to be observed during manufacturing of different products. The students carry out manual operations using mostly hand tools and elementary machines in the carpentry and pattern making shop, bench work and fitting shop, welding shop, sheet metal shop, black smithy and forging shop, machine shop, foundry and casting shop etc..

The common shops and major facilities in the Central Workshop have been divided into various trades as given below: -

i. Machine Shop
ii. Sheet Metal Shop
iii. Bench Work and Fitting Shop
iv. Welding Shop
v. Foundry and Casting Shop
vi. Black Smithy and Forging Shop
vii. Carpentry and Pattern making Shop

Staff associated with Central Workshop

Office of the Central Workshop

• **S.No.**	• **Workshop office Staff**
1.	• Er. Syed Irshad Ahmad Qadri, Officer In-charge/Superintendent
2.	• Mr. Ghulam Mohammad (Tech Asst)
3.	• Mr. Muneer Ahmad (Tech)
4.	• Mr. Manzoor Ahmad (Works Asst)

Sr. No.	Workshop Section	Working Equipment/Machine	Employees (Permanent)	Employees Contractual
1.		• Kirloskar Lathe 8 No's • HMT Lathe 4 No's • Slotting Machine 1 No's • Horizontal Milling 1 No's • Vertical Milling 1 No's • Shaper 1 No's • Grinding Machine 1 No's • Tool & Cutter Grinding M/C 1 No's • Surface Grinder 1 No's • Kirloskar Lathe with tool Dynamometer 1 No's	• Firdous Ahmad Wani (Tech. Asst) • • Javeed Ahmad Ahangar(Tech.) • • Hilal Ahmad Dar(Tech.) • • Altaf Ahmad Bhat(Tech.)	• Mistry Mohammad Nadeem (Technical Assistant)
2.	Sheet Metal Trade	• Hand drill 1 No's • Sheet bending machine 1 No's • Hand shearing machine 1 No's • Table shear cutting machine 1 No's • Power operated shearing M/C 1 No's • Grinding machine 1 No's	• Muhammad Shabaan(Tech.) •	• Ms. Afnan Asad (Technical Assistant). • • Abdul Aziz (Helper).

3.	**Fitting Trade**	• Profile Projector 1 No's • Drilling Machine 1 No's • Arbor Press machine 1 No's	• Gh. Qadir(Tech. Asst) • Mushtaq Ahmad Shah(Tech.) • Mohammad Ramzan(Tech.)	• Dawood Ibrahim Ali • (Technical Asstt)
4.	**Smithy Trade**	• Single Beak Anvil 2 No's • Open Herth Furnace 4 No's • Lever Shear 1 No's	• Mohd. Ismail Kumar(Tech. Asst) • Bashir AhmadSheikh(Tech.)	• Sumeer Kaul (Technical Assistant)
5.	**Foundry Trade**	• None.	• Abdul MajeedAhangar (Tech. Asst) • • Ghulam Rasool Telli (Tech.)	• Zahid Shafi (Technical Asstt)
6.	**Welding Trade**	• MMA (Arc Welding) Machine 1 No's	• Zahoor Ahmad (Tech.) • • Mohammad ShafiChikla (Tech.)	• Mohd. Yousuf (Technical Assistant)
7.	**Carpentry**	• Band Saw 1 No's • Thickness Planner 1 No's • Tenon Machine 1 No's • Grinder 1 No's • Thickness Planner 1 No's	• Showkat Ahmad(Tech.) • • Noor Mohammad(Tech.) • Mohd. Yousuf(Tech.)	• MuzafarShah (Technical Assistant)

Table B.9.3g

Transport/Automobile Facilities

The transport wing of the Central Workshop performs the essential service to the Institute. Presently the institute is having the vehicle strength of nine numbers to carry out the various academic activities of students, faculty and other official works of the institute besides to provide the facility of ambulance services round the clock (24 x 7) during the emergency to the students and staff.

The list of the vehicles performing the various activities of the institute is as under: -

Sl. No.	Name of the Vehicle with make	No of Vehicles	Drivers and cleaners in place	
			Permanent	Contractual
01	32-seaterBus (TATA)	02 Nos	Mr B. Bhadhur (Tech. Asst)	Mr ShowkatAhmad (Driver)
02	Ambulance (Maruti)	02 Nos		Mr Reyaz Ahmad (Driver)
03	Staff Car (Ambassador)	01 No	Mr Khazir Mohammad (Tech Asst)	Mr Shabir Ahmad (Driver)
04	Mini Loader (Truck)	01 No		MrSheraz Ahmad (Driver)
05	Fortuner Car (Toyota)	01 No	Mr Mohd Ayoub (Driver)	Mr Mohammad Yaseen (Conductor)
06	Innova Car (Toyota)	01 No		
07	Scorpio Car (Mahindra)	01 No		

Table B.9.3h

Medical Facilities

NIT Srinagar has its own dedicated Health centre & multifarious medical needs of the campus population consisting of students, staff members, faculty and members of their families are met by institute hospital. It's equipped with all the basic medical facilities and is functional 24*7 with referral and ambulance services. Presently health centre is serving the strength of more than 4000 students plus faculty and staff including their wards. It offers free of cost medical facilities. The hospital is headed by the Head Medical Officer with a team of other specialists, paramedical and supporting staff.

Facilities

List of facilities available at NIT Srinagar Health Centre:

Opd (allopathy)

Patients are registered at the reception and are seen on first come, first serve basis, however out of turn consultation may be provided in case of emergency and senior citizens. Patients have the right to consult any doctor. In OPD, clinical consultation is provided to patients who include history taking, clinical examination, diagnosis and providing prescriptions to patients besides advising laboratory tests in some cases. Medication is provided free of cost to the patients. Sub waiting areas are available in front of individual consultation rooms and laboratory. Public utilities like drinking water and toilet is available. Wheel chairs, trolleys and attendants are there to help very sick patients.

- 

Dental facility

An experienced dental surgeon along with dental assistant provides procedures like dental extraction, scaling/cleaning, RCT, fillings, local curettage. Dental facility is functional from April 2018.

Counseling services

Full time psychological counselor who remains on call 24*7 is available for providing counseling services to the students, staff and faculty members of the institute. Institute counselor pays regular visits to different hostels for conducting awareness programs like stress management, mental health awareness, positive psychology, psychology of happiness & different breathing exercises.

Ward/ipd facility

Ward facilities for observation and management of medical problems like typhoid, acute gastroenteritis, COPD, bronchial asthma, viral fever, pneumonias etc are available. There is one ward with five beds & one isolation room for patients of communicable diseases who require complete isolation.

Physiotherapy services

Full time well experienced physiotherapist is available 24*7 to provide range of physiotherapy services and to assist the patients to recover from wide range of musculoskeletal painful disorders, sports injuries, post operative traumas, neurological disorders and all orthopedic disorders. This facility is functional since February 2018. Following facilities will be available shortly after the establishment of physiotherapy unit; TENS, Laser therapy traction unit, Ultrasound, SWD, Muscle stimulation, Interferential therapy, Matrix Therapy Etc.

Laboratory services

Trained laboratory staff is providing best services & the laboratory is functional 24*7. Painless blood withdrawal & sample collection under all aseptic conditions is done in the laboratory. Following facilities are available;

- CBC
- Lipid profile
- KFT
- LFT
- Uric Acid
- Blood sugar fasting and PP
- HbA1C
- ESR
- CRP, CCP, RF
- Serum LH, FSH, Prolactin, total testosterone
- Thyroid Function Tests
- Vitamin D levels
- HBSAG
- HIV
- HCV
- Vidal for typhoid

- Urine Routine examination
- Sample collection time for laboratory is 7am to 10 am while emergency tests like Blood sugar, platelet count, HB and blood grouping is done in emergent cases throughout OPD hours.

X-ray & ECG services

X-Ray and ECG services are available on all working days during OPD hours & in case of emergency.

Pharmacy

Free reliable quality medicines are available to beneficiaries on doctor's prescription during OPD and night hours by pharmacists.

Minor OT

Provides services for minor surgical procedures like dressing of lacerated wounds, suturing of minor lacerations and re-suturing, excision of corns and cysts under local anesthesia.

Ambulance services

24*7 patient referral and transport services are available during OPD hours as well as emergencies to the nearest super specialty hospitals.

Timings

- Registration/OPD timings- On working days 8:45 a.m to 05:15 pm.
- Laboratory series – 24*7
- Pharmacy – 24*7
- X-ray & ECG services - 8:45 am to 05:15 pm and during emergency.
- In case of emergency Medical officer, physiotherapist, counselor are available on call 24*7.

People /Staff:

S.NO	NAME OF THE OFFICIAL	DESIGNATION	PHONE NO.
01.	Dr Fayaz Bhat	Head (Hospital Services)	9419001544
02.	Dr Mehnaz Rajab	Dental Surgeon	7006563082
03.	Dr Younis	Physiotherapist	9149729529
04.	Mr Mumtaz	Sr. Lab Technician	9906046953
05.	Mr Fairoz Malla	PsyCounselor	9596195546
06.	Mr Lateef	Store Keeper	9149922458
07.	Mr Fayaz Ali	Pharmacist	9796103421
08.	Ms Gincy Paul	Staff Nurse	7780897925
09.	Mr Irfan Sidiqi	X-Ray & ECG Technician	7006428525
10.	Mr Rouf	Pharmacist	7889399568
11.	Mr Waseem Rashid	Lab Assistant	7780923252
12.	Mr Khalid	Pharmacist	9596596880
13.	Mr Nisar	Lab Technician	7006349408
14.	Ms Nazima	Dental Assistant	7006244208
15.	Mr GM Teli	Orderly	8715913281
16.	Mr Bashir Ahmad	Orderly	9796968788
17.	Mr MushtaqAhamd	Orderly	9149516758
18.	Mr Showkat	Ambulance Driver	8491967214
19.	Mr Shabir	Ambulance Driver	9622827668

Table B.9.3i

Special camps and programs conducted:

- Workshop on stress management (June 2019)
- Influenza vaccination (October 2019)
- Mental health Workshop (October 2019)
- Quarantine facilities for staff and travelers (March 2020)
- Special counseling to people with special needs June 19
- Outreach health awareness program at Zalpora with DORAI foundation May

Sr. No.	Name of the Department	Patients Attended
1	COVID-19 Vaccination Drive	• 450 shots administrated till 08 June 2021
2	General OPD	• Students 3890 • Staff 3023
3	Lab investigations	• Biochemistry 1200 • HBA1C 40 • TSH 150 • Blood grouping 70
4	XRAY	• 534
5	ECG	• 220
6	Minor procedures	• Students 480 • Staff 680
7	Dental OPD	• 230
8	Physiotherapy	• 178

9.4 Self-Learning (5)

Claimed 5

The Institute developed an academic system which presents a curriculum which is having flexibility without prejudice to the fundamentals of any subject which are required.

Facilities given by institution for self-learning

- The curriculum offers courses major project where the topics are self selected or based on guide suggestion. The component of self learning is evaluated in these courses.
- Every student has to submit two home assignments in every course which has been evaluated for 10 marks. Some of these tasks are beyond syllabus to encourage outstanding students to develop their self learning capabilities.
- Some of the tasks in the lab courses are challenge based which has to be solved by the students on their own enhancing their skills.
- The program planned weekly time table and facilities in such a way that the students have space and time to explore and implement their ideas.
- Common Computing Center with well equipped and internet facility opened 24X7 for students.
- Digital library is provided in central library where students can access all kinds of E-journals.
- Industrial visits arranged by the Departments.
- Language lab facilities provided – This enables students to prepare to take-up the TOEFL, GRE examinations.
- The Institute encourages the students to attend Industrial training during semester breaks

Modes and Modules for Self Learning and Learning Contents beyond Syllabus:

Seminars

Seminars are taken on the recent research topics. Faculties of various departments can attend these seminars in their respective areas. This enables the faculty to get familiar with the recent researches carried out in various fields.

Department laboratories

The Institute provides well equipped laboratories for the smooth functioning of each department and the details of the same are as follows:

Departments	Total No. of Labs.	Name of the Laboratory	
Chemical Engineering	14	1	Biochemical Engineering
		2	Catalysis
		3	Computer (CAD)
		4	Energy Engineering
		5	Environmental Engineering
		6	Heat Transfer
		7	Fluid Mechanics
		8	Mass Transfer
		9	Mechanical Operations
		10	Membranee Science and Technology
		11	Process Dynamics and Control
		12	Reaction Engineering
		13	Department Workshop
		14	Project Lab
Civil Engineering	12	1	Civil Workshop
		2	Material Testing Lab I
		3	Computer Lab
		4	Geotechnical Engineering Lab
		5	Material Testing Lab II
		6	Transportation Engineering Lab
		7	Environmental Engineering Lab
		8	Project Lab
		9	CAD Lab
		10	Water Resources Lab
		11	Concrete Lab
		12	Earthquake Engg. Lab
Electronics and		1	Analog Electronics Lab
		2	Digital Electronics Lab

	11	3	Advanced Characterization Lab
		4	Communication Lab
		5	Microwave & Radar Lab
		6	Image Processing Lab
		7	Embedded System Lab
		8	VLSI Lab
		9	Project Lab
		10	Bio Medical Engineering Lab
		11	Information Security Lab
Mechanical Engineering	12	1	Mechanical Workshop
		2	Machine Tool Lab & Advanced Machine Tool Lab
		3	Hydraulic Machines Lab
		4	Heat Engines Lab
		5	Fluid Mechanics Lab
		6	Heat Transfer Lab
		7	Mechanical Engineering Lab
		8	Measurements Lab
		9	Computer Lab
		10	Welding Lab
		11	Aerodynamics Lab
		12	Project Lab
Electrical Engineering		1	Computer Lab
		2	Electrical Machines Lab
		3	Electrical Measurements Lab
		4	Virtual Instrumentation Lab
		5	Control Systems Lab

	12	6	Electrical Workshop
		7	Project Laboratory
		8	Basic Electrical Engg. Lab
		9	Microprocessor Lab.
		10	Power Systems Lab
		11	Non-Conventional Energy Systems Lab
		12	DSP Lab

Table B.9.4a

9.4.1 CENTRAL LIBRARY FACILITY

The NIT Srinagar library, LIRC supports the Teaching, Research & and other related programmes of the institute. The Library has a good collection of documents that comprises of Books, Journals, Theses, Video cassettes, Learning Resources (LRs)& Compact discs in the field of Engineering, Science, Management, and Literature & Humanities.
The library has computerized data of whole of its collection using **KOHA software** and is in the process of automating all library operations.

Library Established in	1960
Library Members	4500
Number of Books	68248
Reprographic facility	Xeroxing
Data usage of the Library	70-80% (in terms of Books issued to faculty& students and E-resources used)
Annual Budget	INR 3,00,00,000.00(Three crores)
Timing during working days	8.45 am to12 pm
Timing on Sundays &Holidays	10am to 5pm

Table B.9.4.1a

- **Layout and Floor plan**
    - **Ground Floor: The ground floor houses the following important sections.**
        - Periodical section
        - Circulation section

- Conference Hall
- Acquisition Section/Processing Section
- Stacks I
- Assistant Librarians Room
- Dy. Librarian's room
- Office
- Automation section

- **First Floor: The first floor houses the following important sections.**
  - Textbook & Reference section
  - Reading cum browsing Hall
  - Stacks II

- **Second Floor**
  - Back Volume Section/ ST, SC Section.

- **Library Mission:**
  - To promote the technical knowledge
  - Generation and application of knowledge & resources
  - Effective dissemination of knowledge.
  - Library automation and networking for remote access of online electronic resources.
  - Improve the library resources.
  - Enhance the student experience.
  - Build the digital research environment.
  - Provide convenient and customized access to information Library Resources

- **Library Resources:**
  The library has a wide range of resources on engineering, sciences, humanities & Social Sciences.

Collection	**Size (number)**
Books	68248
Bound volumes of journals	10070
Video cassettes	496
Learning Resources	36

Compact discs	650
Books in Text book section	10037
Books in stacks section	58211
Books in SC, ST section	9898

Table B.9.4.1b

Year	Number of New Titles Added
2016-2017	1193
2017-2018	24
2018-2019	7447
2019-2020	2249

Table B.9.4.1.c

9.4.2 QUALITY OF LEARNING RESOURCES (10)

E-Library (Electronic/On-line resources/e-resource)

E-library provides collaborative search of all type of e-resources/on-line resources such as e-journals and books

- **E-Books**

  Central library procured different type of e-books, online books for students and faculty via IP range in the campus. The different departments can also be access various type of e-books such as text books and reference books in the electronic form.

- **Wiley**

Subjects Covered	URL	Total cost
Civil Engineering & Construction, Electronics &Electrical Engg, Computer Science &IT, Chemistry &Chemical Engg, Physics, Maths&Statistics&Mechanical Engineering.	onlinelibrary.wiley.com Year 2016&2017 No of Titles 829	$88,694.00

Tabl B.9.4.2a

- **Springer Nature**

Subjects Covered	URL	Total Cost
Chemistry & Materials Science, Computer Science, Engineering, Mathematics &Statisticscs, Physics &Astronomy	link.springer.com/openurl?genre=book&isbn=978-1-4471-6807-2 Year 2016 No. Of Titles 3298	€52,759.20

Table B.9.4.2b

- **Elsevier**

Subjects Covered	URL	Total Cost
Chemical Engineering, Chemistry ,Engineering, Materials Science, Mathematics,Physics& Astronomy, Computer Science	sciencedirect.com Year 2016 No. Of Titles 493	$102136.00

Table B.9.4.2c

- **Pearson**

Subjects Covered	URL	Total Cost
Chemistry, Civil Engineering, Computer Science & IT, Electronic Telecommunication, Mathematics, Mechanical Engineering, Physics	lib.myilibrary.com Year 2014-2017 No. Of Titles 312	INR 15,64,059.00 (Fifteen lac sixty four thousand and fifty nine)

Table B.9.4.2d

- **E-Journals**

  - **E-Resources are accessible to our Institute through eShodhSindhu (eSS)**

E-resources	E-resources Subscription Period
ACM Digital Library	January2020 toDecember2021
ASCE Journals	January2020 toDecember2021
ASME Journals Online	January2020 toDecember2021
Economic & Political Weekly	April 2021 to March 2022
Institute for Studies in Industrial Development	April 2021 to March 2022
JGatePlus (JCCC)	January2020 to December 2021
Oxford University Press	April 2020 to March 2022
Springer Link 1700 Collection+ Nature Journals	April 2021 to March 2022
Web of Science Lease Access	January2020 to December2021

Table B.9.4.2e

- **<u>NDL e Resources</u>**

1. World E-Book Library Available through NDLI (National Digital Library of India)
2. South Asia Archives (SAA), National Licensing (perpetual)

- **URKUND Plagiarism software** National Licensing

Back Files of Science Direct Journals from M/S **Elsevier** on the following subjects are now available from **Vol.1, Issue1**up to the year **1994.**

Subjects Covered	Year	URL	Total Cost
Engineering &Technology	Pre 1995	sciencedirect.com	**$1,93,874.00**
Materials Science	,,	,,	
Chemical Engineering	,,	,,	
Computer Science	,,	,,	
Inorganic Chemistry	,,	,,	
Organic Chemistry	,,	,,	
Mathematics	,,	,,	
Business Management Accounting	,,	,,	

Tabl B.9.4.2f

E-Resources subscribed by the Institute (2019-2020)

Subjects Covered	URL	Total Cost
Science Direct (8 subject collection) Jan 2020- Dec 2020	www.sciencedirect.com/	USD 172,882.44
IEEE/IET Electronic Library (IEL) online Jan 2019-Dec. 2018	http://ieeexplore.ieee.org/	INR 35,66,238.76 (Thirty five lac sixty six thousand two hundred thirty eight)
SCOPUS Jan 2020- Dec 2020	www.elsevier.com	USD 23,575.00
TURNITIN (Plagiarism software)		INR 7,37,007.00 (Seven lac Thirtyseven Thousand & Seven)

Table B.9.4.2g

- **BIS &ASTM Standards on our IP range.**

Subjects Covered	URL	Total Cost
BIS	http://standards.bsb.co.in/	INR 12,48,345.60 (Twelve lac Fortyeight Thousand Three Hundred &Forty Five)
ASTM	http://compass.astm.org	INR 7,44,420.44 (Seven lac Fortyfour Thousand Four Hundred & Twenty)

Table B.9.4.2h

Services

- **Membership**

  All the students, faculty members, research scholars & administrative staff can register themselves for the membership of the library. The membership form is available at the circulation counter and the same is required to be attested by the Head of the Department/Section

The number of books borrowed by users is as follows:

Category	Number of Books	Duration
Faculty	10	30 days
Research Scholar	05	15 days
Student	03	15 days
Supporting Staff	02	15 days

Table B.9.4.2i

- **Text Book & Reference Section**

  The textbook and reference section remains open from 8.45 a.m.to 9.30p.m. on all working days and from 10.a.m. to 4.00 p.m. on weekdays & holidays. The books available in this section can be consulted in the library only.

- **Stacks section**

  The books available here are meant to be issued to the faculty, students, research scholars and other readers as per the criteria given in the library rules.

- **Video Library**

  The library has collection of video cassettes, CDs, & LRs.

- **Photo copying facility**

  The photocopying facility is provided to all students and faculty at subsidized rates.

- **Search**

  OPAC (Online public access catalogue), Science Direct, E-Resources, Video library

- **RFID facility**

- Library and Information Resource Centre is currently being remodelled into a smart library. All the supporting Hardware (OPAC Kiosk's, Book Check-in/Check-Out Kiosks, Server's, Intra- Net, Networked Thermal Printers, Smart Staff Stations) and Software (Koha Server, Windows Server, Linux Server, RFID server) is already up and running. The library is also equipped with a wireless security gate that can alert the staff of any unauthorized checkouts whereas 2 high density data servers are running 24*7 in the library.

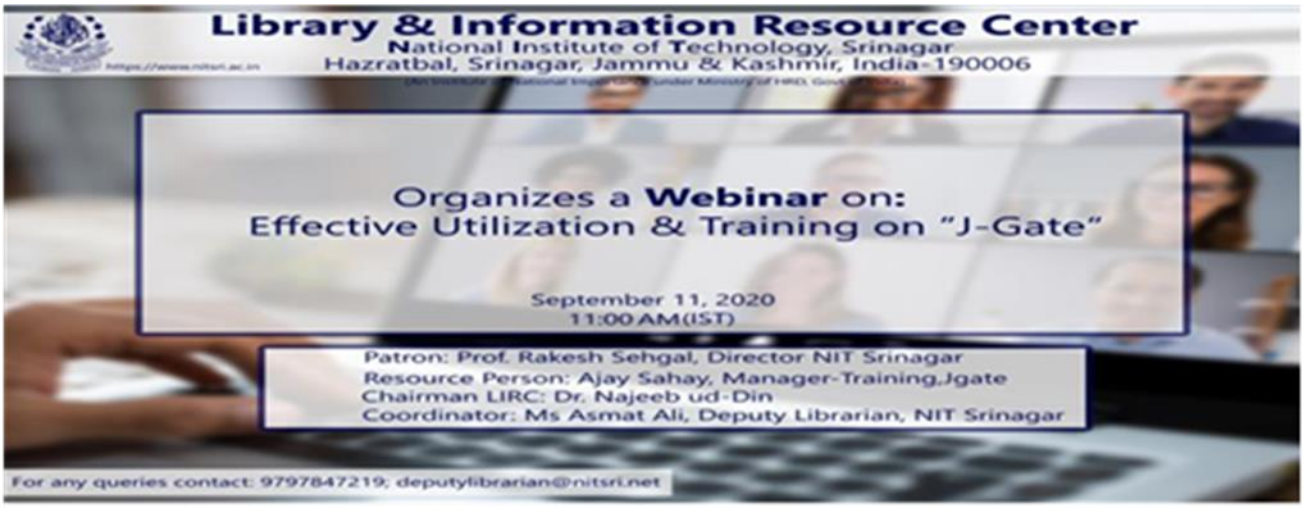
- **Lib website :** The library provides the updates to the patrons via the library webpage https://nitsri.ac.in/Department/Deptindex.aspx?page=a&ItemID=io&nDeptID=ck
- **Library programs/activities:** User awareness webinars and workshops are continuously organised by LIRC.

➢ **Our Team**

Ms. Asmat Ali	Deputy Librarian M 9797847219, Deputylibrarian@nitsri.net
Technical Asstt. (SG)	Mrs Saymee
Technical Asstt	Mrs Tahira
Technical Asstt	Mr. M Y Rather
Assistant (SG)	Mrs.Dilshada
Assistant (SG)	Mrs.Neelofar
Jr. Lib assistant	MrShabir Ahmad Sheikh
Orderly	Mr.Noor Mohammad
Contractual	Six

Table B.9.4.2j


Library & Information Resource Center
National Institute of Technology, Srinagar
Hazratbal, Srinagar, Jammu & Kashmir, India-190006
IEEE
Advancing Technology for Humanity
Organizes a Webinar on:
Unlock your research potential with IEEE Xplore
November 12, 2020
3:30 – 4:30 pm (IST)
Registration Link- http://BIT.LY/REGIEEENOV12
Meeting Link- https://TINYURL.COM/IEEENOV12
Patron: Prof. Rakesh Sehgal, Director NIT Srinagar
Chairman LIRC: Prof. Aijaz Ahmad Zargar
Speaker: Ranbir S Sedhey, IEEE Client Services Manager
Convener: Ms Asmat Ali, Deputy Librarian, NIT Srinagar


Library & Information Resource Center
National Institute of Technology, Srinagar
Hazratbal, Srinagar, Jammu & Kashmir, India-190006
Organizes a Webinar on:
Effective Utilization & Training on "J-Gate"
September 11, 2020
11:00 AM (IST)
Patron: Prof. Rakesh Sehgal, Director NIT Srinagar
Resource Person: Ajay Sahay, Manager-Training,Jgate
Chairman LIRC: Dr. Najeeb ud-Din
Coordinator: Ms Asmat Ali, Deputy Librarian, NIT Srinagar
For any queries contact: 9797847219; deputylibrarian@nitsri.net

Library Committee

Sl. No.	Members of the Library Committee	Department	Responsibility
1.	Prof.Ajaz Ahmed Zargar	Electronics and Communication	Chairman Library Committee
2.	Ms. Asmat Ali	Library	Deputy Librarian
3.	Dr. M Zubair Ansari	Physics	Member
4.	Dr. S. A. Shah	Chemistry	Member
5.	Dr. Ranjeet Kumar Rout	Computer Science and Engineering	Member

6.	Dr. Irfan SamadWani	Metallurgical & Materials Engineering	Member
7.	Dr. M S Charoo	Mechanical Engineering	Member
8.	Dr. Malik Perveez	Chemical Engineering	Member
9.	Dr M AdilBazaz	Electrical engineering	Member
10.	Prof. Nayaz Ahmad	Mathematics	Member
11.	Dr. Prince Ahmad	Physics	Member
12.	Mr. Janibul Bashir	IT	Member
13.	Prof Mir Mukhtar		Member

Table B.9.4.2k

NPTEL

The National Programme on Technology Enhanced Learning (NPTEL), a project funded by MHRD, provides e-learning through online web and video courses in engineering, Sciences, Technology, Management and Humanities. This is a joint initiative by seven IITs and IISc Bangalore. Other selected premier institutions also act as Associate Partner Institutions.

Industrial Visits

All the departments of the institution provide facilities for industrial visit. The students identify reputed industries from their discipline and are approved by the Director through the head of the department. The prior permission is obtained from the industry to visit it. The students are accompanied by minimum of two faculty members. During the curriculum two one day visits and a 3 to 5 days visit are organized.

9.5 Career Guidance, Training, Placement (10)

Claimed 10

The objective of the placement cell is to mould the students to cope with the changing demands of the corporate world and place them in reputed companies based on the expected job profiles of each student

Placement activities

The Placement and Training department monitors the employment opportunities, cater to enhance employability of students and arrange on and off campus interviews. Our Campus recruitment program starts right from the penultimate semester. It's a policy of the Placement department not to patronize companies bend on doing Education & Training activities to attract the students in the name of recruitment against payment.

The placement department does not encourage the students, those who are placed through campus selection in a company to attend the further campus interviews so as to provide a chance for other students to get placed. The students aspiring for higher studies are encouraged to undergo GATE/CAT exams.

Functioning of placement cell

National Institute of Technology Srinagar (NIT Srinagar) lays emphasis on the placement of the students by training and preparing the students to face the real life situation after graduation. An exclusive Placement & Training department under the guidance of an eminent professor collects the data of the graduating students and maintains a comprehensive database for ready reference.

The Institute provides an environment for comprehensive and harmonious development of the personality. We have regular communicative English Program incorporated in the curriculum. Further, resource persons and professionals from the field of communication and interpersonal skills are invited to equip our students with necessary soft skills required to face the interviews in today's competitive world. Such training exposure enhances the students' employability. Goal setting Time Management and Prioritization are the Key points that are implanted in the Youngminds.

Institute also provides need-based programs on software relevant to industry such as VLSI, Embedded Technology, Auto/Electrical CAD, Pro/E, JAVA, J2 EE, just to mention a few.

Placement Details

Academic Year	Branch	Batch Size	Placement	Higher Studies	Entrepreneur in Engineering/Technology	Placement Percentage
CAYm1 (Current Assessmen	ECE	44	16	7	-	52
	MECH	54	20	5	-	46
	CIVIL	75	31	16	-	63

t Year) (2019-20)	CHEM	34	10	5	-	44
	ELE	48	13	16	-	60
CAYm2 (2018-19)	ECE	72	39	10	-	71
	MECH	72	32	12	-	61
	CIVIL	109	34	28	-	57
	CHEM	59	19	6	-	42
	ELE	73	34	12	-	63
CAYm3 (2017-18)	ECE	74	33	8	2	58
	MECH	75	27	4	1	42
	CIVIL	118	44	19	2	55
	CHEM	62	18	8	-	41
	ELE	73	32	13	2	65

Table B.9.5a

List of Companies Visited The Campus

Placement details for the year 2019-20, batch 2016-20 passing out in 2020	
S.no.	**Name of the company**
01	Avanti Learning
02	Vedantu Innovations
03	GreyB
04	CEAT Tyres
05	Sagacious Research
06	Tata Project
07	Secon
08	Amdocs(Off Campus)
09	Maruti Suzuki
10	L&T Limited
11	Bansal Classes
12	Remote State
13	L&T Construction
14	Alstom (PPO,Off Campus)
15	Wipro Turbo
16	Capgemini
17	Tally Solutions
18	CGI
19	Policy Bazaar
20	Vedanta
21	ZS Associates [Consultancy]
22	Blogvault
23	OYO
24	Brillio
25	Eagle View[Off Campus]
26	Byjus

27	Infosys Power Programmer
28	Eagle View
29	Clarico
30	Optum
31	Samsung R&D
32	Rajdeep Infotech
33	Wheelseye
34	Increff
35	Cogoport[Off Campus]
36	GAIL [PSU]
37	Lowe's Services
38	OIL India

Table B.9.5b

Placement details for the year 2018-19, batch 2015-19 passing out in 2019	
S.no.	**Name of the company**
01	Fourkites India Pvt Ltd.
02	Medlife
03	Nutanix
04	Teksystem
05	Grey B
06	Resonance
07	Wipro Turbo
08	L & T Construction
09	Amdocs
10	Nextscm Solution Pvt. Ltd
11	Zs Associates
12	Avanti Learning
13	Infosys(power Programmer)
14	JIO Financial Services
15	Persistent System
16	Saggezza
17	Mahindra Comviva
18	Vedanta
19	Sagacious Research
20	Kpit Technologies
21	Tata Power
22	Virtussa Polaris
23	Cummins
24	Greaves Cotton
25	SKF
26	Escorts
27	Gail India
28	BYJUS
29	ESSAR STEEL INDIA

30	Infosys
31	IKARUS(Intern)
32	Cogoport
33	NHIDCL
34	Gammon Pvt Ltd
35	JSW
36	JCB
37	HLC Asia
38	Anglo Eastren
39	JIO Infocom Pvt Ltd
40	Wheelseye Technologies Pvt Ltd
41	Stellarix
42	Blogvault (Intern)
43	BYJU's
44	Mind Tree

Table B.9.5c

Placement details for the year 2017-18, batch 2014-18 passing out in 2018	
S.no.	**Name Of Company**
1	Adobe Systems
2	Sheroes
3	Nucleus
4	Lg Soft
5	Samsung (R&D)
6	Hpcl
7	Artic Invent
8	Blogvault (Intem)
9	Adverb(Internship)
10	Infosys
11	Tata Projects
12	Ibm
13	Rankwatch
14	Lnt Infotech
15	Sagacious Research
16	Jcb
17	Kec
18	Kpit
19	Johnson Controls
20	Resonance
21	Virtusa
22	Cummins
23	L&T Contruction

24	Tat Power
25	Gray B
26	Afcon Infrastructre
27	Tek Systems
28	Persistent Systems
29	Tata Motors
30	Reliance JIO
31	Wipro
32	Zs Associates
33	Vedanta
34	Envestnet Yodlee
35	Oil India
36	Iocl
37	Gail

Table B.9.5d

Activities from Student Welfare Cell for Career Guidance and Counseling

Career Guidance and Counselling is a comprehensive, developmental program designed to assist students in making and implementing informed educational and occupational choices. Career guidance and counselling program develops an individual's competencies in self-knowledge, educational and occupational exploration, and career planning.

Objectives

- To create awareness among the students for their futureprofession.
- To provide guidance to the students on various options available in the courses of theirstudy
- To provide information to the students on the scope and relevance of any area irrespective of their field ofinterest.
- To provide guidance to develop positive attitude and behaviour in order to meet challenges of life to make ithealthier.
- Resource persons from different fields deliver talks about career options to students and teachers and staff of the Institute through guidance and career counselling seminars and workshops.
- Activities of student Welfare Cell include Career Guidance and Counselling. The faculty also participates in personal counselling:
- To help students to chalk out academic roadmaps forthemselves.
- To enable students to integrate themselves with themilieu.
- To acquaint them with various career options throughseminars.
- To address problems related to stress, anxiety, examination phobia, peer pressure and adjustment to changedenvironment.

- To help students, Periodic reports are shared with parents whenever necessary. Aptitude tests have been carried out to see the inclination of the students. Students were made to undergo this test and they had much to avail themselves ofit.

Effective services for career guidance including counseling for higher studies Training details for students:

S.No.	Course/activity	Status of The course	Source of the Resources
1	Technical English & Communication skills	Curricular	In house
2	Professional Ethics	Curricular	In house
3	Aptitude	Co-academic	Both internal and external
4	Campus Recruitment Training	Co-academic	Both internal and external
5	Workshops	Co-academic	External
6	EventspecificProgrammes like GATE coaching	Co-academic	In house

Table B.9.5e

Provisions for improving Placements

- **Offering more elective subjects** in order to offer a wider perspective for the students to choose from. On other hand, the students would get an opportunity to have exposure to the emergingtechnologies.
- Some of the students may even come to a clear understanding that such sub-areas exist in their area of activity such they would visualize their career in thoseareas.
- **Projects** are introduced in order encourage positive compartmentalization of learning and to offer simulated industrialoperations.
- In addition to the above, teachers offer counselling individually or in small groups.
- Separate Placement & Training Cell ismaintained.

Coordinators from various streams are appointed to assist and supervise relations with various industries.

Industrial Training

The fundamental objective of Industrial Training is to prepare students for future employment in their chosen engineering discipline. Industrial Training enhances the academic material studied at University by allowing students to practice what they have learned and to

develop key professional attributes. Industrial training should provide an opportunity for studentsto:

- Experience the discipline of working in a professional engineeringorganization
- Develop understanding of the functioning and organization of abusiness
- Interact with other professional and non-professionalgroups
- Apply engineering methods such as design and problemsolving
- Develop technical, interpersonal and communication skills, both oral and written

Industrial training also gives employers an opportunity to assess future employees.A demonstrated commitment and ability to take responsibility, make sound decisions, and apply technical skills will be highly regarded. Industrial training gives students an opportunity to evaluate future employers as well as enabling informed decisions about the discipline and career paths to follow.

Final Year (2020 Passing Out Batch):

- We are in regular touch with the companies which have done recruitment from our college last year, the companies are also supporting and no offer has been revoked till now and has informed all the companies individually through mail regarding the rescheduled academic calendar.

For prefinal years (2021 Passing Out Batch) :

1) Organized a Pre Placement Assessment Test in Partnership with First Naukri.
2) Internship/ Training Opportunities: Automation Edge, Krayonz, Teksystem, Juspay, Edvizo, MCKINLEY & Rice , Mckinsey & USA, Internshala, Mission ED , HIEE (Paid Virtual Training), Phoenix Global, Vedantu, Edvizo
3) Online Test of TCS Coding Ninjas
4) Several Companies have started approaching for recruitment of 2021 Passing Out Batch: (Amdocs, Capgemini, Lowes, Optum, Odessa, Eaton, Mckinley & Rice, Teksystem)
5) Online Coding Classes by Career Launcher

Training & Placement Officer
Dr. Obbu Chandra Sekhar
Head Training & Placement Department
NIT Srinagar
Mobile: 9440343273
Email-id: obbuchandra@nitsri.net
placements@nitsri.ac.in

Infrastructure and Facilities available in the placement cell:

- Number of interview rooms: 2
- Number of GD rooms:1
- Number of chambers for HR personnel: 2
- Number of guest rooms for HR personnel:6

Members of Placement Cell:

- Full-time Officers: 1 (1 TPO)
- Full-time Trainers: 2 (Soft skills & PersonalityDevelopment)
- Student Volunteers attached to placement cell:32

9.6 Entrepreneurship Cell (5)

Claimed 5

Innovation, Incubation and Entrepreneurship Development Centre (IIEDC)

IIED centre is headed by Prof. Saad Parvez. The Centre aims to nurture and inspire the young entrepreneurial brains of the Institute as well as the region to peruse innovations, start-ups and entrepreneurship by creating a vibrant and conducive ecosystem in the region. We aim to empower Startups to grow through innovations & design in order to provide a fulcrum to the economic augmentation and employment opportunities.

The incubation centre is facilitating and nurturing the growth and development of innovators and start-ups through hand-holding, providing the right mentorship, developing and testing prototypes and offering other technical, financial and managerial services.

The centre provides a strong institutional framework in place for effective implementation, monitoring and evaluation of our objectives. It is continuously in a process of creation of start-up endeavours with disruptive value addition in various thrust areas like technology development, agriculture including horticulture, renewable energy, handicraft, electronic system design, manufacturing, IT-enabled and other services etc.

About the Activities:

IIED Centre NIT Srinagar is a community comprising a bunch of students working in partnership with academic researchers, Innovators, Idea generators and industry entrepreneurs to instigate breakthroughs. (***Fusing the uncommon, taking risks, thinking big)***

Following cells/clubs constitute the centre activities

1. Entrepreneurship Development Cell (EDC)

EDC Cell enhances an existing potential or asset through the process of learning and

application of entrepreneurship dynamics. The cell polishes the entrepreneurial skills into a student needed to establish his/her ideas and vision into reality.

2. Innovation Cell (IC)

Innovation Cell initiates a program and participates in activities creative in nature to transform ideas into solutions. It bridges the gap between research and education with industry. During each engagement companies, educators, experts and students collaborate on real-world problems in order to deliver real-world solutions.

3. Grass Root Innovation Design Studio (GRIDS)

At GRIDS, the grassroots innovations from non-technical innovators are taken into the incubation phase for leveraging into holistic and interdisciplinary nature of design to cut across research and move projects from research to development.

4. Institute Industry Interaction Cell (IIIC)

III Cell bring industry thought leaders with college experts to seed innovative thinking and to enable collaboration in technology, products, services, and business models.

5. Skill Development Club (SDC)

Skill Development Club is trying hard to develop the dynamic skill requirements of students by organizing skill development programmes and workshops to increase the employability of students to bridge the gap between education and industry. The main motive of the club is to recognise the team's potential and to adapt to the changing circumstances.

6. TOD FOD JOD Club (TFJ)

TFJ is a initiative program which is aimed at improving **(IQ)** innovation quotient of students. Our esteemed alumnus Mr. **Vikas Chawda,** founder and CEO of **Quantum Leap,** conducted the workshop session of TFJ's and initiated the process of TFJ to enhance creativity among young minds.

Benefits for the students

1. Become a leader- manage a student organization, illustrate abilities in planning, logistics, marketing, and advertising, create visibility for futureemployers.
2. Build a network- make contacts with entrepreneurs, professionals and academics who

can help with recommendations, network and start a venture withpeers.

3. Initiate innovative activities- invite business leaders to campus, plan new and exciting events for students to kick-start learning about new industries and different aspects of businessplanning.

Functions of the Entrepreneurship Cell:

- To inculcate a culture of innovation-driven entrepreneurship through studentprojects.
- To organize Entrepreneurship Awareness Camps, Entrepreneurship Development Programmes, Faculty Development Programmes and Skill Development Programmes in theInstitute/institution.
- To arrange interaction with entrepreneurs and create a mentorship scheme for student entrepreneurs.
- To facilitate the creation of an entrepreneur's club in each department to foster a culture of entrepreneurship amongstudents
- To disseminate knowledge and insights in entrepreneurial theory and practise through lectures activities andworkshops.
- Build knowledge and skills to translate ideas into opportunities while they are on campus.
- Be motivated to start theirown companies after graduation or after a few years of gaining industryexperience.
- Be inspired to consider entrepreneurship as a possible careeroption

<u>Major Projects Undertaken By Iied Centre</u>

1. **Project of National importance (value 2.5 million Rs.)**

- Govt of India, Department of Rural Development & Panchayati Raj, sponsored Time & Motion Study (TMS) project, under progress in three regions of Jammu, Kashmir & Ladakh to determine the standard time of MGNREGA workers for wage determination process and propose Innovative tools and process for accomplishing the MGNREGA activities.

2. **Innovative Project having social impact successfully completed (2017-2018)**

   - Designed and developed NIF Sponsored project titled "Value Addition in Wood Fired Bukhari" under Grass-root innovation design studio (GRIDS) which is under commercialisation and marketing stage.

Figure B.9.6.1: Innovative Project having a social impact

Achievements of IIED Centre, NIT Srinagar

1. **Smart India Hackathon (SIH) 2019:** NIT Srinagar students participated in SIH 2019 organised by MHRD's Innovation Cell. Students of NIT Srinagar received Second Runner up prize worth Rs. 50,000 at VelTech Chennai.

Figure B.9.6.2: Students working for making prototype at SIH-2019

Figure B. 9.6.3: Students of NIT Srinagar awarded Prize of Rs. 50,000

2. Since the last three years Centre is participating in the Meeting of National Innovation clubs at Rashtrapati Bhavan and presenting innovative projects.

Figure B.9.6.4: Students at Rashtrapati Bhawan

3. To unleash the young creative minds the centre conducted a number of workshops on TOD-FOD-JOD for school children

Figure B.9.6.5: TOD, FOD, JOD, Skill Development program at Schools

4. Idea Challenge 2018

Figure B. 9.6.6: Idea Challenge 2018

`Few successful Innovative Project & Startups

- **Yuwa Innovators** Food Grain Washer and Water Purifier Machine

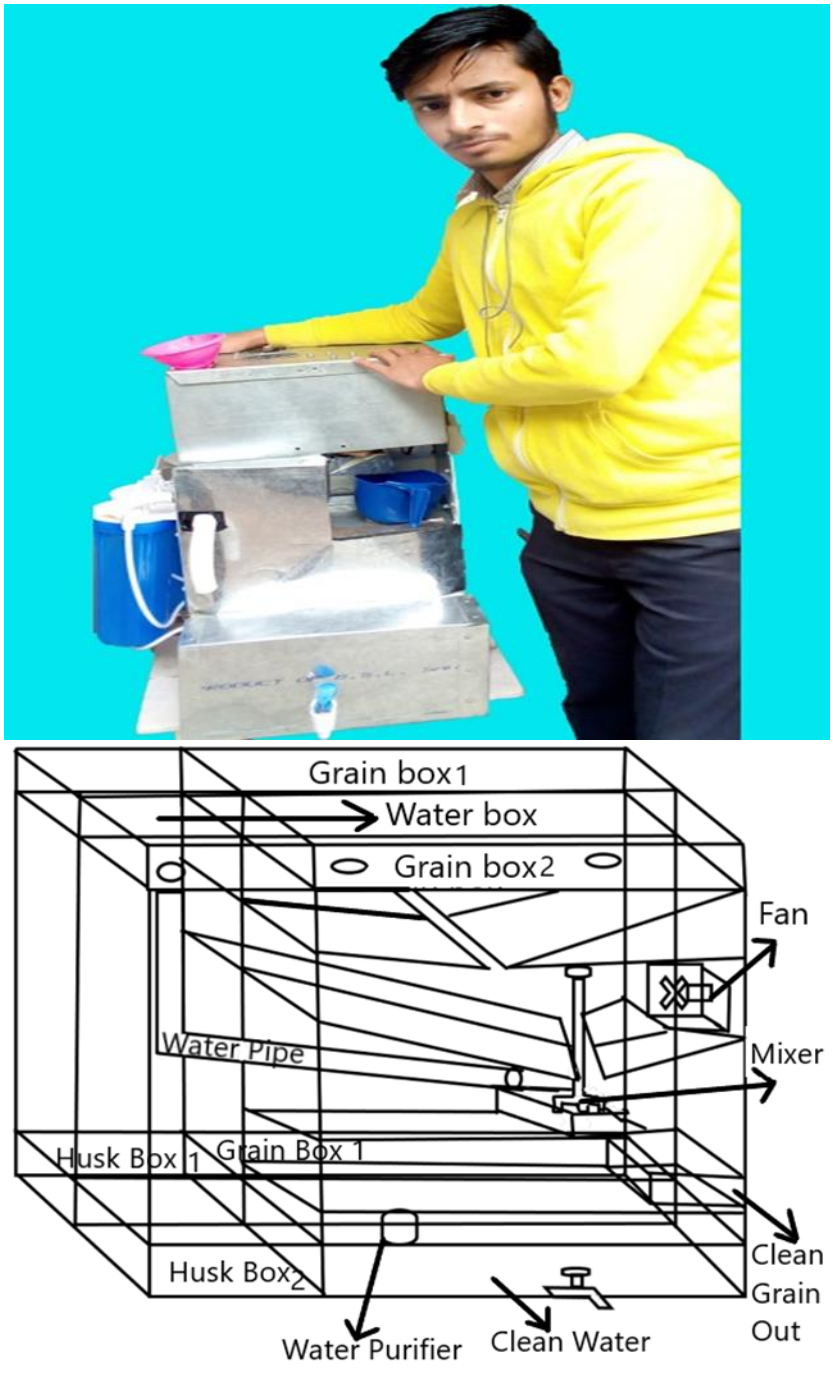


Figure B.9.6.7: Food Grain Washer and Water Purifier Machine

MSME Ministry approves BI at NIT Srinagar

- The proposal submitted by the institute for its recognition as Host Institute for implementation of the scheme "Support for Entrepreneurial and Managerial Development of MSMEs through Incubator" has been considered & approved during the Meeting of PMAC held on 20/12/2019 at New Delhi.
- The centre recently received the approval of Rs. 1 crore from MSME, J&K, for setting the Incubation Centre at NIT Srinagar.
- The centre recently received the approval of Rs. 15 lac each for two ideas from MSME, J&K, for incubating ideas.

INNOVATION, INCUBATION AND ENTREPRENEURSHIP DEVELOPMENT CENTER

List of activities undertaken by IIED Centre during the year 2017, 2018 and 2019

Sl. No.	Date	Name of Event	Organized By	No. of Attendee	Co-ordinator/s faculty/students
01	April 3, 2017	Seminar on "Emerging trends in Android based mobile app"	Mr. Abhishek Kumar, Senior Corporate Technical Trainer (IBM Experts)	118	HEAD, IIED Centre
02	April 15-16, 2017	Two day's workshop on Robotics	Utkranti, eDC Team, IIT Delhi	78	HEAD, IIED Center
03	April 29-30, 2017	Two day's Workshop on "PLC & SCADA"	CETPA Infotech. Pvt. Ltd.	63	Vaibhav Mishra ShrishtiHooda Suryansh Mishra
04	May 6-7, 2017	Two day's workshop cum National	TechieNestPvt. Ltd. And IIT Hyderabad	82	HEAD, IIED Centre

		Championship on Internet of things			
05	June 10, 2017	Interaction session with Kashmir's Entrepreneurs	Founder of KashBook, Co-Founder of Captivating Kashmir and INSPIRE award winner Zufa Iqbal	97	Rahul Kumar Shriyansh
06	Sep 6-7, 2017	"Youth Entrepreneurship in conflict areas" Symposium in Srinagar, J&K	CHINAR International in association with South Asia Network of Impact Masters and IIED Center, NIT Srinagar	27	HEAD, IIED Centre
07	Oct 2, 2017 (MEGA EVENT)	IDEA CHALLENGE 2017 – "The Future World"	IIED Centre	1000+	IIEDC Team 9with prize money worth 30,000 distributed to winners)
08	Oct 2, 2017	Swach Bharat Abhiyan	Srinagar Municipal Corporation	43	Shriyansh
09	Oct 2, 2017	Orientation Session of Batch 2016 & Batch 2017	IIED Centre	600+	IIEDC Team
10	Oct 5, 2017	Orientation program of "The Better You"	STARTUP KASHMIR	134	Abhishek Gourav Rahul Kumar

					Shriyansh
11	Oct 29, 2017	One day seminar on "Importance of international certification in Design, Automation and IT industries"	CETPA Infotech. Pvt. Ltd.	540+	Shriyansh Rahul Kumar
12	Nov 2, 2017	Interaction Session with "Prof. Anil Kumar Gupta", Founder of Honey Bee Network.	Central University of Kashmir	18	Rahul Kumar
13	Nov 9, 2017	Catalysing a cultural shift in youth entrepreneurship	EDP Cell on National Entrepreneurship Day	88	Nishant Sharma ManikLamba
14	March 19, 2018	Festival of Innovation and entrepreneurship, 2018			
14	October 9, 2018	Idea Challenge 2018	IIEDC	115	IIEDC members
15	July 2019	Smart India Hackathon (SIH)	MHRD	6	IIEDC
16	Oct 2020	Finance of startups"	IIEDC	-	IIEDC
17	November, 2020	Online Freshmen Orientation	IIEDC	-	IIEDC

18	November 2021	Panel Discussion Event	IIEDC	-	IIEDC
19	November, 2020	Idea Pitching Competition	IIEDC	-	IIEDC

Apart from the above, the IIED centre is working for the establishment of state of the art Incubation centre for which DPR is being prepared with help of consultants.Successfully handed over an innovative project titled as "Value addition in a room warmer, Bukhari" to NIF which was commercialised and handed over to a local firm for production.

THE CONCEPT OF IDEA BANK

(Given by IIED Centre and is being implemented in differentschools andinstitutions of the valley)

5-3-2016

A bank is a facility where people invest their money to get higher value of their investments. The banking process is interrelated to the general economic system of a nation. Billions of people invest in different schemes to obtain benefit in different ways. Innovation involves improving the way of producing goods or services. Often it involves creating better or efficient technology or a value addition in a product, process, procedure or method. Innovation may be the result of Research & Development. But innovation could also be a 'brainwave' – A Eureka moment where someone has a good idea to improve working practices. Idea generation is the creative process used in order to figure out solutions to difficult challenges.Idea generation is a natural process which flashes in the mind and is generated through some mechanism. This mechanism could be a long continuous effort towards solving a problem. It could also be a whim, contemplation, intuition, or perception which may arise because of knowledge, experience or a hunch. Every individual in his life generate ideas to resolve a problem or feels that his idea if applied or processed might provide a solution when known solutions are unavailable. His idea may or may not mature or may vanish from his mind. Converting ideas into accomplishments is a tedious process and requires the application of certain resources, knowledge and processes. There are many situations in which some brilliant idea that might have made a difference, fade and vanish away because of the lack of the right approach in protecting and storing it. Idea bank is a concept that provides a platform where the ideas of individuals are deposited and stored. The processing of these ideas can be carried in incubation centres nearest to such banks leading to

its logical conclusion. It is a structured methodology which can help individuals to process their idea to obtain the solution for their problem. The banks initially collect ideas. These ideas are taken to the second phase where they are further filtered and relevant ideas are allowed to enter the next stage. In the third stage, the relevant experts process these ideas and add value to it. This stage may define the material requirements, technology to be used, bill of materials, drawing, processes, methods etc., whatever is relevant for the idea. This is the major stage that enables to develop a prototype or defines a new process or method.

Idea banks need to be established in:

1. Primary and secondary level Schools.

2. All other educational institutions including Institutes, universities, technical and non-technical institutions, training centres industries, service and manufacturing units.

Idea banks need to coordinate at different levels to share and develop ideas, a mechanism of which could be developed.

INVITATION LECTURE BY AN EMINENT PROFESSOR

Date: 20-**05-2016**

Professor K.L. Chopra, eminent Scientist, academician and ex- Director IIT Kharagpur, visited NIT Srinagar and delivered an expert lecture on the topic, **"NURTURING INNOVATION & ENTREPRENEURSHIP IN ACADEMIA" on 24th May, 2016 (Tuesday) at 4.00 p.m.,** in the institutes HI-TECH room.

The lecture was very informative and thought provoking and was appreciated by one and all.

Finance of startups

Figure B 9.6.8: Finance of startups

IIEDC, NIT Srinagar organized an online speaker session on the topic "Finance of startups" on 1st November 2020, 3 pm IST. The session was hosted by Tajamul Ashraf and coordinated by Ayush Kumar. The session was graced by the presence of eminent speaker Dr Fouzia Jan, who is an expert in financial management. She presented her ideas on various fundamental topics of finance like funding, equity dilution, revenue models, pricing models, investment etc. She helped enthusiastic young students in understanding the complex dimension

of the aforementioned topic. The session ended with a Q&A session in which students raised various interesting questions.Overall, the session was quite informative and interesting and it fascinated students about the financial management.

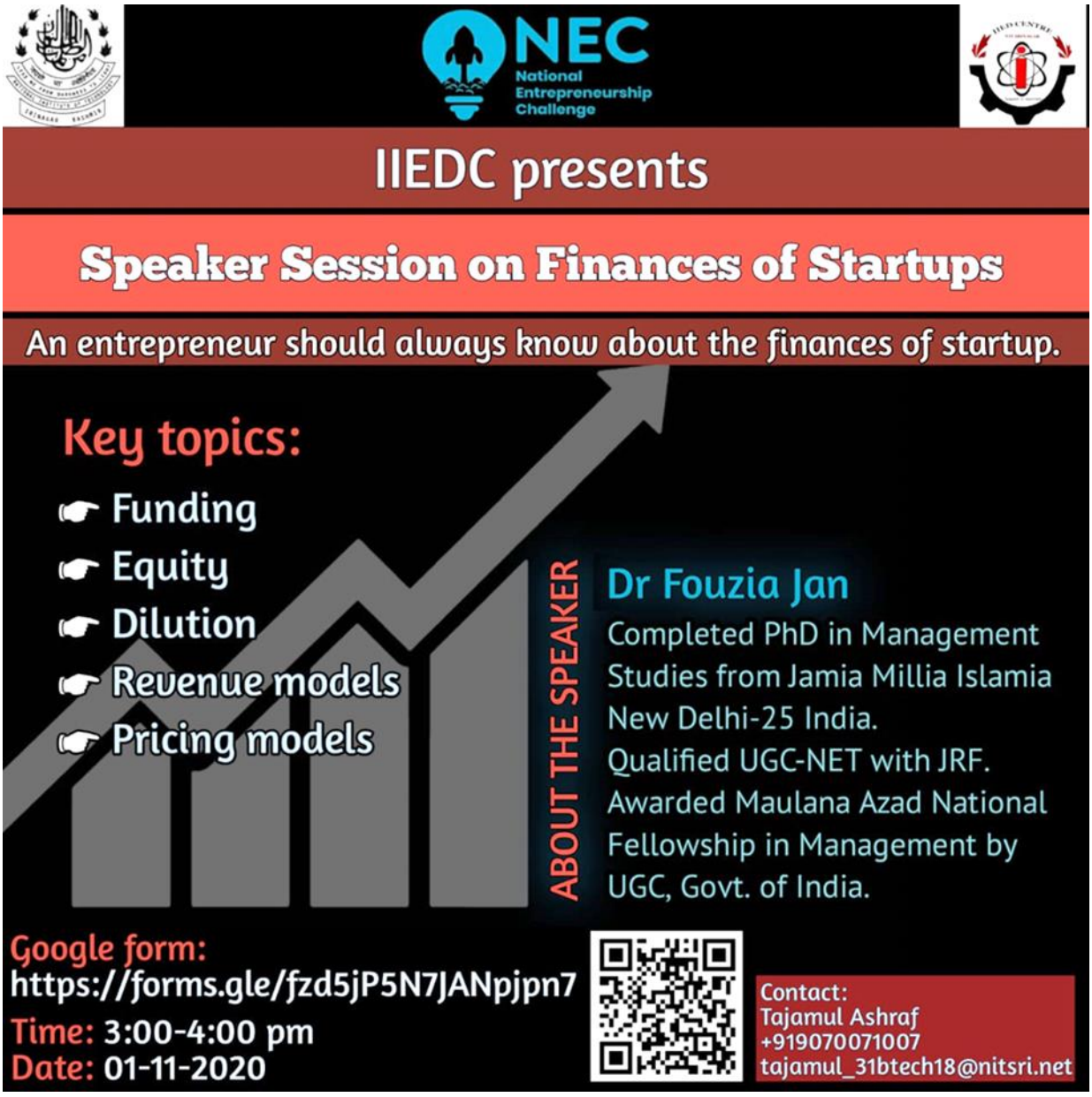


Figure B.9.6.9: Finance of startups

Figure B. 9.6.10: Panel Discussion

PANEL DISCUSSION was conducted on 26th November 2021 hosted by NIT SRINAGAR. As the name conveys it's a discussion carried by three prominent speakers on respective topics. The topics of discussion were:

1)"pros and cons of choosing jobs"
2)"pros and cons of going for higher studies"
3)"pros and cons of becoming entrepreneur"

The primary aim of this event is to bring in speakers from different areas of expertise.we collected details from linkedin and mailed them to invite them to the speaking session.This event is conducted to eliminate the dilemma of every student of choosing between jobs, pursuing entrepreneurship and continuing with higher studies. Every coin has two sides. Every student needs proper counselling to decide their future journey.It was an interactive session where students from NIT SRINAGAR and outside got an opportunity to explore all the possible

options. The panellist talked about how to choose between entrepreneurship, higher studies and jobs. We have learned about inherent qualities of entrepreneur and what kind of thinking turns you into entrepreneur.

Idea Pitching Competition

Figure B. 9.6.11: Idea Pitching Competition

Pitching is one of the most important aspects, while one is are starting a startup. You may need to pitch your startup to your customers or your investors. It is a skill that an entrepreneur should master. You should always practice what you have learned and competing against each other helps everyone learn more about pitching.

Pitching basically means giving a presentation of a business idea to potential investors. In the field of entrepreneurship, knowing how to pitch your idea is very important to understand. For this very reason, J&K's biggest Idea pitching competition was held by IIEDC, NIT Srinagar on 30th November, 2020. Entries were invited from students of the valley to give a PowerPoint presentation explaining their business idea.

9.7 Co-Curricular and Extra-curricular Activities (10)

Claimed 10

- Students are encouraged to participate in extracurricular activities.
- Music and Hobbies clubs are functioning very effectively.
- All the departments have their own technical societies which organise technical seminars, quizzes and other competitions in the departments to give a thrust to the development of the academic potential of the students.
- NSS units have also been rendering valuable service by inculcating the habits of social and national responsibilities amongst the students.
- A technical fest called 'Techvaganza' is conducted every year.
- Our students participate in cultural activities outside the campus also.

9.7.1 Sports and Games Facilities

Adequate provisions for extra-curricular activities are available in the institute. At present, facilities are available for Badminton, Volley-Ball, Football, Cricket, Basketball, Kho-Kho, Kabaddi, Athletics and other Indoor Games.

Details of Faculty/ Staff in Charge for Sports and Games

Name	Designation	Department
Dr. Manoj Kumar	Coordinator Sports and Student Activities	Physical Education
Ms. K. A. Mir	SAS Officer	Physical Education

Table B.9.7a

Faculty Profile for Physical Education

1. Name: Dr. Manoj Kumar
Email: manojkumar@nitsri.net
2. Name: Ms. K. A. Mir
Email: kowsaralimir@gmail.com

Inter-Semester Sports Meet: The Institute organizes the biannual sports meet in every academic year, known as Inter-Semester Sports Meet. Inter-Semester Sports Meet provides an excellent platform for the students to exhibit their sports and game capabilities. Various events like Badminton, Volley-Ball, Football, Cricket, Basketball, Kho-Kho, Kabaddi, Chess, Carrom, Hockey, Table tennis and Athletics 100-meter, 200-meter400-meter, 800-meter race, high jump, long jump, shot put, etc are conducted.

Figure B.9.7.1:Inter-Semester Sports Meet

Sports and Games Facilities

S.no.	Name of the event	Area	Mode of game
1	Table Tennis	8 standard tables	Indoor
2	Basketball	38 m x 18m(2)	Outdoor
3	Volley ball	40 m x 25 m (3)	Outdoor
4	Carom	game boards (10)	Indoor
5	Badminton courts	7 courts	Outdoor
6	Football	110 m x 70 m	Outdoor
7	Chess	game boards (20)	Indoor
8	Gymnasium (Boys)	25 m x 15 m (Fitness Equipments)	Indoor
9	Gymnasium (Girls)	13 m x 7 m	Indoor
10	Cricket	Hard Pitch	Outdoor

Table B.9.7b

Sports Events Conducted/ participated/ in and outside NIT Srinagar from 1st January 2015 upto 31st April 2018

S.No.	Sports Event/s	Place and month where played/ conducted	Prizes/ Awards/ Positions
1.	All India Inter NIT Cricket(Boys)/ Swimming (Boys & Girls) Tournaments	NIT Rourkela (January 2017)	5th place in Cricket
2.	Coaching Camp for Boys & Girls in Chess & Table Tennis	NIT Srinagar (March 2017)	All the students of NIT Participated
3.	All India Inter NIT Table tennis(Boys/Girls) and Chess (Boys & Girls) Tournaments at NIT Srinagar	NIT Srinagar (April 2017)	Winner T.T (boys) Chess Runner up (girls) And T.T (girls) 2nd runner up
4.	IST State Championship of Cricket (Boys), Football (Boys) and Basketball (Boys).	Jammu University (April 2017)	Runner up Basketball 4th place in cricket
5.	Summer State Basketball League.	Indoor Stadium 2017	Runner up
6.	Inter-Semester Spring Tournament in all Games (Boys & Girls)	NIT Srinagar (May 2017)	All the students of NIT Participated
7.	Yoga day	NIT Srinagar (June 2017)	All the students of NIT Participated
8.	Open Badminton Tournament (Boys)	NIT Srinagar (August-September 2017)	All the students of NIT Participated
9.	Inter-Semester Autumn Tournament in all Games (Boys & Girls)	NIT Srinagar (September 2017)	All the students of NIT Participated
10.	Club Activities	NIT Srinagar (September 2017)	All the students of NIT Participated

11.	RashtriyaEktaDiwas	NIT Srinagar (October 2017)	All the students of NIT Participated
12.	Open (Tennis Ball Cricket/Cosco Cricket Tournament	NIT Srinagar (October 2017)	All the students of NIT Participated
13.	Cricket Tournament with Government Dental Institute Srinagar	NIT Srinagar (November 2017)	Winner
14.	All India Inter NIT Kabaddi (Boys)	NIT Surathkal (January 2018)	Participation
15.	All India Inter NIT Badminton (Boys/Girls) and Basketball (Boys) Tournaments at NIT Warangal	NIT Warangal (January 2018)	4^{th} place in basketball 5^{th} place in badminton
16.	2nd State Championship of Cricket (Boys), Football (Boys) Badminton (Boys) and Table tennis (Boys).	Jammu University (April 2018)	Winner in Table tennis 3^{rd} place in badminton 3^{rd} place in cricket
17.	Inter-Semester Spring Tournament in all Games (Boys & Girls)	NIT Srinagar (April 2019)	All the students of NIT Participated
18.	International Yoga day	NIT Srinagar (21 June 2019)	All the students of NIT Participated
19.	Ranneeti (Running Events)	IIT Mandi (October 2019)	5000m Gold Medal 1500m Silver Medal 800m Silver Medal
20.	All India Inter NIT Athletic Meet (Boys/Girls)	NIT Rourkela January 2020	5000m Gold Medal 1500m Bronze Medal

Table B.9.7c

Figure B.9.7.2 Additional Student Activities Held During the Past Three Years

S. No.	Particulars	Year
1.	Yoga Day	2017 - 2020
2.	Cleanliness Drive (Swachh Bharat Abhiyan)	
3.	Alumni Meet	
4.	Fresher's Day/Orientation Programme	
5.	Farewell	
6.	Induction Programme	
7.	Stress Management	
8.	Passport Mela	
9.	Musical Concert (Ustad Kamal Sabri)	
10.	Techvaganza	
11.	Fit India freedom run	
12.	Hindi Diwas	

Table B.9.7d

Figure B.9.7.3: Techvaganza 2019

Figure B.9.7.4: Music club

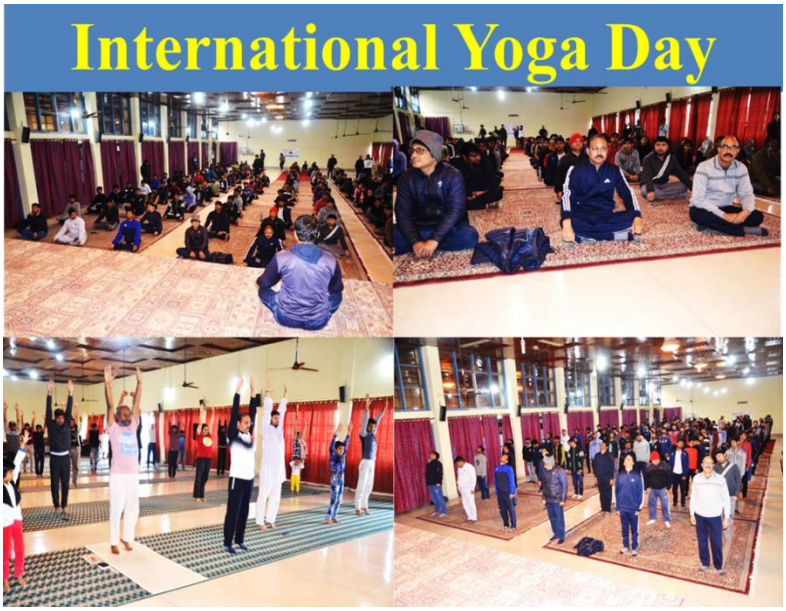


Figure B.9.7.5: International Yoga Day

Figure B.9.7.6: Fit India 2020

Figure-B-9.7.7 Fit India Freedom run 2020

Figure B.9.7.8: Swachh Bharat Diwas-2020

Figure B.9.7.9: Hindi Diwas-2020

The Hindi Cell along with the Counselling Cell of the Institute has organized the competitions on the occasion of Hindi Diwas, 2020 (On 14th Sept 2020).

The following categories were there:

1. Essay-Writing competition. Students have allowed writing the essay in Hindi or Urdu in about 1000 words.

2. Poetry Recitation/Storytelling competition.

The contests have conducted live over Google Meet.

CRITERION 10	Governance, Institutional Support and Financial Resources	120
	Marks Claimed	120

10.1. Organization, Governance and Transparency (55)

Claimed 55

10.1.1. State the Vision & Mission of the Institute (5)

Claimed 5

VISION OF THE INSTITUTE

To establish a unique identity of a pioneer technical Institute by developing a high-quality technical manpower and technological resources that aim at economic and social development of the nation as a whole and the region in particular keeping in view the global challenges.

MISSION OF THE INSTITUTE

M1. To create a strong and transformative technical educational environment in which fresh ideas, moral principles, research and excellence nurture with international standards.

M2. To prepare technically educated and broadly talented engineers, future innovators and entrepreneurs, graduates with understanding of the needs and problems of the industry, the society, the state and the nation.

M3. To inculcate the highest degree of confidence, professionalism, academic excellence and engineering ethics in budding engineer

10.1.2 Availability of Institutional Strategic Plan and its Effective Implementation and Monitoring (25)

Claimed 25

The institute has prepared Vision Document for 15 years up-to 2025. The said document is placed as **Annexure-I.**

10.1.3 Governing body, administrative setup, functions of various bodies, service rules procedures, recruitment and promotional policies (10) **Claimed 10**

10.1.3.1. BOARD OF GOVERNORS:

Chairman	Nominated under Section 17(15) of the First Statutes of NIT Act 2007	Prof. RakeshSehgal Director National Institute of Technology Srinagar, Hazratbal, Kashmir-190006
Ex-Officio	Nomination under Section 11 of NIT Act, 2007 (29 of 2007) Clause (b)	Prof. RakeshSehgal Director National Institute of Technology Srinagar, Hazratbal, Kashmir-190006
Two persons not below the rank of the Joint Secretary to the Government of India to be nominated by the Central Government from amongst persons dealing with technical education and finance	(c)	Joint Secretary (NITs & DL), Ministry of Human Resource Development, Department of Secondary & Higher Education, Government of India, New Delhi
	(c)	Joint Secretary & FA, Ministry of Human Resource Development, Department of Secondary & Higher, Government of India, New Delhi
Two persons to be nominated by the Government of the State in which the Institute is situated, from amongst persons, who, in the opinion of that Government, are technologists or industrialists of repute	(d)	Commissioner Secretary, Higher & Technical Education Dept., Government of Jammu and Kashmir, Civil Secretariat, Srinagar / Jammu
	(d)	Awaited
Two persons, at least one of whom shall be a woman, having special knowledge or practical experience in respect of education, engineering or science to be nominated by the Council	(e)	Dr. Prema Ram Chandran Director, Nutrition Foundation of India, Delhi
	(e)	Awaited
One Professor and one Assistant Professor or a Lecturer of the Institute to be nominated by the Senate	(f)	Prof. Mohammad Farooq Wani Professor, Mechanical Engineering Department, National Institute of Technology Srinagar
	(f)	Dr. Mohammad ShafiCharoo Associate Professor, Mechanical Engineering Department, NIT Srinagar
The director of the IIT in whose zone the institute is located, or his nominee, not below the rank of a Professor.	(g)	Prof. Manoj Singh Gaur Director, IIT Jammu
Member-Secretary	Section 18 Clause (2)	Dr. S. K. Bukhari Registrar, National Institute of Technology Srinagar.

10.1.3.2. FINANCE COMMITTEE:

Chairman		Prof. RakeshSehgal Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006
Members: Two persons nominated by the Central Government	1 2	Joint Secretary (NITs & DL), Ministry of Human Resource Development, Department of Secondary & Higher Education, Government of India, New Delhi Joint Secretary & FA, Ministry of Human Resource Development, Department of Secondary & Higher, Government of India, New Delhi.
Two persons nominated by the BOG from amongst its members	1 2	Prof. Mohammad Farooq Wani, Professor, Mechanical Engineering Department, National Institute of Technology Srinagar. Dr. Mohammad ShafiCharoo Associate Professor, Mechanical Engineering Department, NIT Srinagar
Director (Ex-officio)		Prof. RakeshSehgal Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006
Member Secretary (Ex-officio)		Dr. S. K. Bukhari, Registrar, National Institute of Technology Srinagar

10.1.3.3. SENATE:

The Director, ex-officio, who shall be the Chairman of the Senate	Prof. RakeshSehgal Director, National Institute of Technology, Hazratbal, Srinagar-190006	Chairman
Three persons, one of whom shall be a woman, not being employees of the Institute, to be nominated by the Chairperson in consultation with the Director, from amongst educationists of repute, one each from the field of science, engineering and humanities;	Prof. Mehraj-ud-Din Vice-Chancellor, Central University of Kashmir, Srinagar (J&K)	Member
	Prof. S. K. Koul Professor, Centre for Applied Research in Electronics (CARE), Indian Institute of Technology, HauzKhas, New Delhi.	Member
	Prof. AzraNahidKamili Dean Biological Sciences & HOD, Environmental Sciences, University of Kashmir	Member
One person to be nominated from the Industry	Mr. Deepak Bhasin B-134, NarainaVihar, New Delhi.	Member
Institute alumnus	Er. Mufti MusharibGul General Manager, BSNL Srinagar	Special Invitee
The Professors appointed or recognized as such by the Institute for the purpose of imparting instructions in the Institute.		Members
Such other members of the staff as may be laid down in the statutes.		Members
Registrar	Dr. S. K. Bukhari Registrar, National Institute of Technology Srinagar	Secretary

10.1.3.4. BUILDING AND WORKS COMMITTEE:

Chairman		Prof. RakeshSehgal, Director, National Institute of Technology Srinagar Hazratbal, Srinagar-190006
Members: Nominated by MHRD and IFD New Delhi	1 2	Director **OR** Deputy Secretary (NITs), MHRD, Department of Secondary & Higher Education, Government of India, New Delhi Director **OR** Deputy Secretary (Finance), Integrated Finance Division (IFD) MHRD, Government of India, New Delhi – 110 001
One person nominated by the Board of Governors		Mr.Fayaz A. Khan, Chief Town Planner, Kashmir
Dean, Planning & Development		Prof. B. A. Mir, Dean, Planning & Development, NIT Srinagar
Nominee of the CPWD / State PWD		Superintendent Engineer (Civil), Jammu Central Circle, Landoi Bridge, Satwari Jammu SE (Electrical), Special Invitee Chandigarh Central Electrical Circle-II, CPWD Chandigarh Executive Engineer (Civil), Special Invitee CPWD, Srinagar Executive Engineer, Electric Division 4th, J&K Government, PDD Srinagar
Secretary		Dr. S. K. Bukhari Registrar, National Institute of Technology Srinagar

10.1.3.5. Function and responsibilities of key bodies:

The functions of key bodies are depicted in table below:

Bodies	Functions and Responsibilities
Board of Governors	❖ The Board shall be responsible for the general superintendence, direction and control of the affairs of the Institute. ❖ Take decision on questions of policy relating to the administration and working of the Institute ❖ Institute courses of study at the Institute ❖ Make statutes ❖ Institute and appoint persons to academic as well as other posts in the Institute ❖ Consider and modify or cancel ordinances ❖ Consider and pass resolutions on the annual report, the annual accounts and the budget estimates of the Institute for the next financial year as it thinks fit and submit them to the Council together with a statement of its development plans ❖ Exercise such other posers and perform such other duties as may be conferred or imposed upon it by this act or the statutes ❖ The Board shall have the power to appoint such committees, as it considers necessary for the exercise of its powers and the performance of its duties under this Act.
Finance Committee	❖ Examine and scrutinize the annual budget of the Institute prepared by the Director and make recommendations to the Board ❖ Give its views and make its recommendations on any financial proposals or issues affecting the Institute to the Board either on the initiative of the Board or of the Director or on its own motion
Building and Works Committee	❖ The Building and Works Committee shall under the directions of the Board carry on construction of all major works after the necessary administrative approval and expenditure sanction from the Board. ❖ Have the power to give the necessary administrative approval and expenditure sanction for minor works and works pertaining to repair and maintenance, within the approved budgetary provision of the Institute and the Board will define the minor work and minor repair and maintenance in terms of quantum or expenditure. ❖ Cause to prepare estimates of cost of buildings and other capital works, minor works, repairs, maintenance and the like. the Building and Works Committee shall approve the cost estimates for minor works, minor repairs and maintenance. ❖ Be responsible for making technical scrutiny of the design, estimates and specifications of the material as may be considered necessary. ❖ Be responsible for enlistment of suitable contractors and acceptance of tenders and shall have the power to give directions for departmental works where necessary duly recommended by the Dean (P&D) of the Institute. ❖ Have the power to settle rates not covered by tender and settle claims and disputes with contractors. ❖ In the opinion of the Chairman of the Building and Works Committee, any emergency has arisen which requires immediate action to be taken, he shall take such action and report the same to the Building and Works Committee and the Board at their next meeting. ❖ Shall also perform such function and exercise such powers as may be entrusted by the board from time to time.
	❖ Frame and revise curricula and syllabi for the courses of studies for the various Departments and Centers. ❖ Make arrangements for the conduct of examinations, appointment of examiners,

Senate	moderators, tabulators and other matters relating to the examinations. ❖ Declare the results of the examinations or to appoint committees or Officers to do so and to make recommendations to the Board regarding conferment or grant of degrees, diplomas and other academic distinctions or titles. ❖ Appoint Advisory Committees or Expert Committees or both for the Departments or Centres of the Institute to make recommendations on academic matters connected with the working of the Departments or Centres. ❖ Appoint Committees from amongst the members of the Senate, other Teachers of the Institute an expert from outside to advice on such specific and important academic matters as may be referred to any such committee by the Senate. ❖ Consider the recommendations of the Advisory Committees attached to various Departments or Centers and that of Expert and other Committees and take such action (including the making of recommendations to the Board) as warranted by each case. ❖ Make periodical review of the activities of the Departments or Centers and take appropriate action (including the making of recommendations to the Board). ❖ Supervise the working of the Library of the Institute. ❖ Promote research and academic development or activity within the Institute and seek reports on such research or academic development or activity from the persons engaged therein. ❖ Provide for the inspection of the classrooms, laboratories, library and the Residential Hostels. ❖ Plan co-curricular activities of the students of the Institute. ❖ Award stipends, scholarships, medals and prizes and make other awards in accordance with such conditions as may be attached to the awards. ❖ Make recommendations to the Board to disseminate knowledge through distance learning mode to various parts of the State or country or abroad and in the cases of signing of agreement with the foreign agency, agreement may be signed with approval of the ministry. ❖ Make recommendations to the Board to disseminate knowledge through distance learning mode to various parts of the State or country or abroad. ❖ Invite up to two student representatives during discussion of general nature not involving policy or disciplinary matter in the Senate meetings.

10.1.3.6. Frequency, Participations details of External Members and Attendance of Board of Governors, Finance Committee, Building and Works Committee and Senate:

S. No.	Date of meetings	Academic Year	No. of participants (external members)	Total No. of participants
Board of Governors:				
1	06-03-2021	2020-21	05	09
2	18-01-2021	2020-21	04	09
3	28-09-2020	2019-20	04	09
4	07-07-2020	2019-20	05	10
5	29-06-2020	2019-20	05	11
6	14-03-2020	2019-20	04	08
7	21-12-2019	2019-20	04	08
8	19-10-2019	2019-20	03	08
9	28-06-2019	2019-20	04	08
10	28-05-2019	2019-20	05	09
11	14-12-2018	2018-19	04	08
12	29-09-2018	2018-19	03	07
13	14-03-2018	2017-18	02	06
14	21-11-2017	2017-18	03	07
15	19-06-2017	2017-18	03	07
Finance Committee:				
1	18-01-2021	2020-21	04	06
2	28-09-2020	2019-20	03	06
3	07-07-2020	2019-20	02	05
4	21-12-2019	2019-20	02	06
5	19-10-2019	2019-20	02	07
6	28-06-2019	2019-20	02	06
7	28-05-2019	2019-20	02	06
8	14-03-2019	2019-20	02	06
9	14-12-2018	2018-19	02	06
10	29-09-2018	2018-19	02	05
11	14-03-2018	2017-18	02	05
12	21-11-2017	2017-18	02	05
Building and Works Committee:				
1	20-12-2019	2019-20	03	06
2	27-05-2019	2019-20	06	10
3	28-09-2018	2018-19	05	09
4	01-11-2017	2017-18	05	10
Senate:				
1	20-10-2020	2019-20	04	45
2	14-01-2020	2019-20	02	38
3	29-04-2019	2019-20	03	48
4	08-08-2018	2018-19	05	47
5	27-12-2017	2017-18	01	42

10.1.3.7. Minutes of the meetings and action taken reports:

10.1.3.7.1. Minutes of the 102nd meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on December 21, 2019 at 12.30 p.m. at C-15, Panchsheel Enclave, Near Chirag Delhi Flyover, New Delhi

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006	Director / Chairman
2	Shri Madan Mohan Additional Director General, NITs, MHRD, Department of Higher Education, Government of India, New Delhi	Member
3	Mr.TalatParvez, Commissioner / Secretary to Govt., Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Srinagar	Member
4	Mr. D. K. Singh, Deputy Secretary, Integrated Finance Division (IFD), MHRD, Department of Higher Education, Government of India, New Delhi	Member
5	Prof. Manoj Singh Gaur, Director, Indian Institute of Technology Jammu, J &K	Member
6	Prof. Mohammad Farooq Wani, Professor, Mechanical Engineering Department, National Institute of Technology Srinagar	Member
7	Dr. Mohammad ShafiCharoo, Associate Professor, Mechanical Engineering Department, NIT Srinagar	Member
8	Dr. Syed Kaiser Bukhari, Registrar, National Institute of Technology Srinagar	Secretary

Prof. A. Goswami, Professor & Twinning Coordinator, Mentor Institute, IIT Kharagpur did not attend the meeting:

Minutes of the 101th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on October 19, 2019 at 12.00 noon. at C-15, Panchsheel Enclave, Near ChiragDili Flyover, New Delhi.

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir	Director/Chairman
2	Smt. DarshanaMomayaDabral IAS JS & FA, Ministry of Human Resource Development, Department of Higher Education, Government of India, New Delhi	Member
3	Shri Madan Mohan, Additional Director General NITs, Department of Higher Education, Ministry of Human Resource Development, Government of India, New Delhi.	Member
4	Mr.TalatParvez, Commissioner / Secretary to Govt., Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Srinagar	Member
5	Prof. Mohammad Farooq Wani, Professor, Mechanical Engineering Department, National Institute of Technology Srinagar.	Member
6	Prof. M. A. Lone, Civil Engg. Department, NIT Srinagar (Chairman DPC)	Special Invitee
7	Dr. Mohammad ShafiCharoo, Associate Professor, Mechanical Engineering Department, NIT Srinagar	Member
8	Dr. Syed Kaiser Bukhari, Registrar, National Institute of Technology Srinagar	Secretary
The following members did not attend the meeting:		
1	Prof. Manoj Singh Gaur, Director, Indian Institute of Technology Jammu, J&K	
2	Prof. A. Goswami, Professor & Twinning Coordinator, Mentor Institute, IIT Kharagpur	

10.1.3.7.2. Minutes of the 100th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on June 28, 2019 at 12.00 noon.At C-15, Panchsheel Enclave, Near ChiragDili Flyover, New Delhi.

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006	Director/Chairman
2	Smt. DarshanaMomayaDabral IAS JS & FA, Ministry of Human Resource Development, Department of Higher Education, Government of India, New Delhi	Member
3	Mr.TalatParvez, Commissioner / Secretary to Govt., Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Srinagar.	Member
4	Mr. A. K. Singh, Under Secretary NITs, Department of Higher Education, Ministry of Human Resource Development, Government of India, New Delhi.	Member
5	Prof. Manoj Singh Gaur, Director, Indian Institute of Technology Jammu, Jammu. **(Participated in the meeting through Skype)**	Member
6	Prof. Mohammad Farooq Wani, Professor, Mechanical Engineering Department, National Institute of Technology Srinagar.	Member
7	Dr. Mohammad ShafiCharoo, Associate Professor, Mechanical Engineering Department, NIT Srinagar	Member
8	Dr. S. K. Bukhari, Registrar, National Institute of Technology Srinagar.	Secretary
Prof. A. Goswami, Professor & Twinning Coordinator, Mentor Institute, IIT Kharagpur, a special Invitee member, did not attend the meeting.		

10.1.3.7.3. Minutes of the 99th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on May 28, 2019 at 12.30 p.m. at C-15, Panchsheel Enclave,
Near ChiragDili Flyover, New Delhi.

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006	Director / Chairman
2	Mr. D. K. Singh, Deputy Secretary, IFD, Ministry of Human Resource Development, Department of Higher Education, Government of India, New Delhi	Member
3	Mr. A. K. Singh, Under Secretary NITs, Department of Higher Education, Ministry of Human Resource Development, Government of India, New Delhi	Member
4	Prof. Manoj Singh Gaur, Director, Indian Institute of Technology Jammu, J & K	Member
5	Dr. Prema Rama Chandran, Director, Nutrition Foundation of India, C-13, Qutab Institutional Area, New Delhi	Member
6	Mr.TalatParvez, Commissioner / Secretary to Govt., Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Srinagar	Member
7	Prof. Mohammad Farooq Wani, Professor, Mechanical Engineering Department, National Institute of Technology Srinagar	Member
8	Dr. Mohammad ShafiCharoo, Associate Professor, Mechanical Engineering Department, NIT Srinagar	Member
9	Dr. S. K. Bukhari, Registrar, National Institute of Technology Srinagar.	Secretary

10.1.3.7.4. Minutes of the 98th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on December 14, 2018 at 03.30 p.m. at C-15, Panchsheel Enclave, Near ChiragDili Flyover, New Delhi.

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, kashmir-190006	Director / Chairman
2	Mr. Madan Mohan, Deputy Director General, MHRD, Department of Secondary & Higher Education, Government of India, New Delhi	Member
3	Mr. Anil Kumar Director, Integrated Finance Division, MHRD, Department of Secondary & Higher Education, Government of India, New Delhi	Member
4	Prof. Manoj Singh Gaur, Director, Indian Institute of Technology Jammu, J &K	Member
5	Dr. Prema Ramachandran, Director, Nutrition Foundation of India, C-13, Qutab Institutional Area, New Delhi 110016.	Member
6	Prof. Mohammad Farooq Wani, Professor, Mechanical Engineering Department, National Institute of Technology Srinagar.	Member
7	Dr. Mohammad ShafiCharoo Associate Professor, Mechanical Engineering Department, NIT Srinagar	Member
8	Dr. Nisar Ahmad Mir, Registrar, National Institute of Technology Srinagar.	Secretary

Ms.Sarita Chauhan, IAS Commissioner / Secretary to Govt., Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Jammu could not attend the meeting.

10.1.3.7.5. Minutes of the 97th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on September 29, 2018 at 03.00 p.m. in the Committee Room of the National Institute of Technology Srinagar, J&K

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006	Director / Chairman
2	Ms.Sarita Chauhan, IAS Commissioner / Secretary to Government, Higher Education Department, Government of J&K, Civil Secretariat, Srinagar	Member
3	Mr. Anil Kumar, Director, IFD, MHRD, Department of Higher Education, Government of India, New Delhi	Member
4	Mr. A. K. Singh, Under Secretary, MHRD, Department of Higher Education, Government of India, New Delhi	Member
5	Prof. Mohammad Farooq Wani Mechanical Engineering Department, National Institute of Technology Srinagar	Member
6	Dr. Mohammad ShafiCharoo Assistant Professor, Mechanical Engineering Department, NIT Srinagar	Member
7	Dr. Nisar Ahmad Mir, Registrar, National Institute of Technology Srinagar	Secretary

The following members could not attend the meeting:

1	Dr. Prema Ramachandran, Director, Nutrition Foundation of India, C-13, Qutab Institutional Area, New Delhi 110016, India
2	Mr. Sheikh ZubairAslam, Hassan Sons Group, Srinagar Kashmir

However comments were received from Mr. A. K. Singh, Under Secretary, MHRD, Department of Higher Education, Government of India, New Delhi vide F.No.16-7/2017-TS.III dated 28-09-2018. These were circulated among the members before the deliberations of the agenda. These comments were taken into account while taking the decisions.

10.1.3.7.7. Minutes of the 96th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on March 14, 2018 at 12.00 p.m. at NIT Transit House, Safdarjung Enclave, New Delhi

The following were present:

1	Prof.RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006	Chairman
2	Smr. Drshana M. Dabral, JS & FA, MHRD, Department of Secondary & Higher Education, Government of India, New Delhi	Member
3	Shri K. Rajan, Under Secretary, MHRD, Department of Secondary & Higher Education, Government of India, New Delhi	Member
4	Prof.RajinderAmbardar, Metallurgical & Materials Engineering Department, National Institute of Technology Srinagar.	Member
5	Dr. Mohammad Hanief, Assistant Professor, Mechanical Engineering Department, NIT Srinagar	Member
6	Dr. Nisar Ahmad Mir, Registrar, National Institute of Technology Srinagar	Secretary

The following members could not attend the meeting:

1	Dr.Prema Ramachandran, Director, Nutrition Foundation of India, C-13, Qutab Institutional Area, New Delhi 110016, India
2	Dr. Asgar Hassan Samoon, Commissioner Secretary, Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Jammu.
3	Mr. Sheikh ZubairAslam, Hassan Sons Group, Srinagar Kashmir

10.1.3.7.8. Minutes of the 95th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on November 21, 2017 at 02.00 p.m. at NIT Transit House, Safdarjung Enclave, New Delhi.

The following were present:

1	Dr. M. J. Zarabi, (Chairman, Board of Governors, NIT Srinagar), C/o. C-28, Pamposh Enclave, Greater Kailash Part-1, New Delhi-110048	Chairman
2	Prof. RakeshSehgal, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir-190006	Ex-Officio
3	Shri. A. K. Singh Under Secretary (NITs), Ministry of Human Resource Development, Department of Secondary & Higher Education, Government of India, New Delhi	Member
4	Shri. D. K. Singh, Under Secretary (IFD), MHRD, Department of Secondary & Higher Education, Government of India, New Delhi	Member
5	Dr.Prema Ramachandran, Director, Nutrition Foundation of India C-13, Qutab Institutional Area New Delhi 110016, India	Member
6	Dr. RajinderAmbardar, Professor, Metallurgical & Materials Engineering Department, National Institute of Technology Srinagar.	Member
7	Dr. G. M. Rather, Professor, Electronics & Communication Engineering Department, National Institute of Technology Srinagar.	Special Invitee
8	Prof. M. S. Mir, Registrar, National Institute of Technology Srinagar.	Secretary

The following members could not attend the meeting:

1	Dr. Asgar Hassan Samoon, Commissioner Secretary, Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Jammu.
2	Mr. Sheikh ZubairAslam, Hassan Sons Group, Srinagar Kashmir
3	Dr. Mohammad Hanief, Assistant Professor, Mechanical Engineering Department, NIT Srinagar

The Chairman Board of Governors (BOG) started the deliberations by welcoming the members to this 95th BOG meeting, especially Director, Prof. R. Sehgal who has recently been selected as Director NIT Srinagar and has joined on 09-11-2017. The Chairman BOG hoped that his tenure would take the institute to new heights.

10.1.3.7.9. Minutes of the 94th meeting of Board of Governors

National Institute of Technology Srinagar, Hazratbal, J&K
Held on June 19, 2017 at 03.30 p.m. at NIT Transit House, Safdarjung Enclave, New Delhi.

The following were present:

1	Dr. M. J. Zarabi, (Chairman, Board of Governors, NIT Srinagar), C/o. C-28, Pamposh Enclave, Greater Kailash Part-1, New Delhi-110048	**Chairman**
2	Prof. A. R. Dar, Director, National Institute of Technology Srinagar, Hazratbal, Kashmir	**Ex-Officio**
3	Mr. K. Rajan, Under Secretary, Technical Education (NITs) Represented on behalf of Joint Secretary (NITs & DL), MHRD, Department of Secondary & Higher Education, Government of India, New Delhi	Member
4	Mr. D. K. Singh, Under Secretary (IFD), Smt. DarshanaMomayaDabral, Represented on behalf of Joint Secretary & FA, Ministry of Human Resource Development, Department of Secondary & Higher Education, Government of India, New Delhi.	Member
5	Dr. Prema Ramachandran, Director, Nutrition Foundation of India C-13, Qutab Institutional Area New Delhi 110016, India	Member
6	Prof.RajinderAmbardar, Metallurgical & Materials Engineering Department, National Institute of Technology Srinagar.	Member

The following members could not attend the meeting:

1	Dr. AsgarSamoon, Commissioner Secretary, Department of Higher Education, Government of Jammu and Kashmir, Civil Secretariat, Srinagar.
2	Mr.ShiekhZubairAslam, Hassan Sons Group, Srinagar Kashmir
3	Prof.Fayaz Ahmad Mir, Registrar, National Institute of Technology Srinagar.

10.1.4 Decentralisation in working and grievance redressal mechanism (5) **Claimed 5**

10.1.4. (A) Organizational Structure

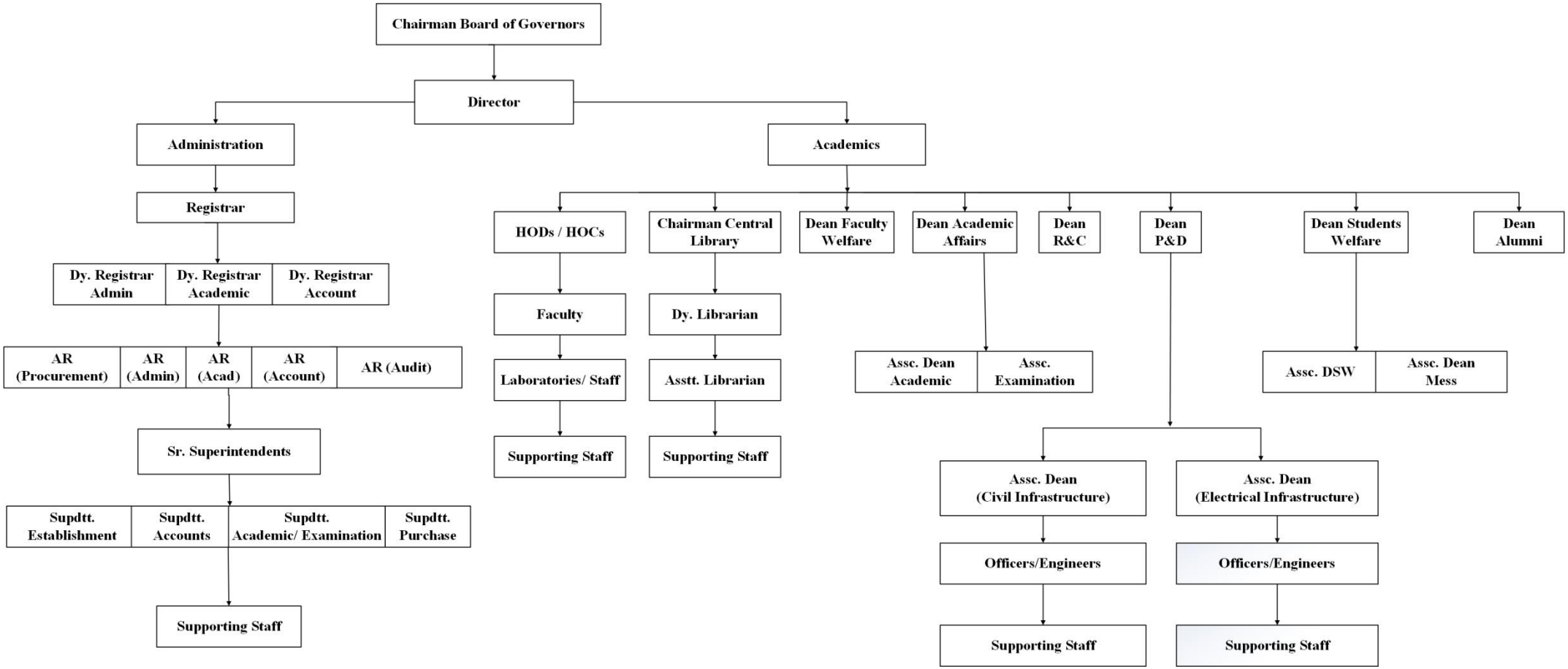


Figure B.10.1.4

Decentralization in Working: Faculty Development is delegated to the Dean Faculty Welfare:

- Students' Academic Activities and Examination is being looked after by Dean Academic Affairs who further is assisted by Associate Dean Academics and Associate Dean Examination.
- Developmental works of the Institute is being looked by Dean Planning & Development who is being assisted by Associate Dean.
- Training and Placement is delegated to Dean Alumni and International Affairs.
- The Students Activities, Hostels, Security is being looked after by Dean Students Welfare.
- Research and Consultancy of the Institute is being looked after by Dean Research and Consultancy.
- Office Administration and other matters are being looked after by Registrar.
- The Departments and Centres are being looked after by Heads of Departments and Heads of Centres.

All the above arrangements report to the Director of Institute in their day- to-day official activities and assignments.

10.1.4 B. Mechanism and Composition of Grievance Redressal system.

The Institute receives grievance both online and off line. The online grievances are addressed through online mode after obtaining the relevant information for concerned quarters. The offline grievances are also responded through surface mail to the aggrieved parties.

Further for grievance Redressal of teaching and non-Teaching staff committees are constituted to look into the complaints/ grievances from the aggrieved. The report of the grievance committee is forwarded to the Director for further necessary action and the corrective measures are taken. Following Grievance Committees have been constituted:

1. **Grievance Committees:**

- **For Faculty**

Prof. S. A. Lone	Chairman
Dr M Haneif	Member
Dr Shabir Ah. Sofi	Member
Dr Jaya Shrivastava	Member
Mr. Mohd Ashraf Sofi	Member Secretary

- **For Non-Faculty**

Prof. A. M. Shah Professor Kashmir University	Chairman
Prof. A. A. Zargar Professor Electrical Engg. Deptt.	Member
Prof. G. M. Rather Professor ECE Department	Convener

- **For Students**

Dr. Abdul Liman	Chairman
Dr. Neyaz Ahmad Sheikh	Member
Dr. AtiqurRehman	Member
Dr. M. A. Rather	Member
Er. TanveerRasool	Member

2. For Anti-Ragging Committee

Dr. Abdul Liman	Chairman
Dr. Neyaz Ahmad Sheikh	Member
Dr. AtiqurRehman	Member
Dr. M. A. Rather	Member
Er. TanveerRasool	Member
Concerned HOD	Member
Medical Officer	Member
Dy. Registrar (Academics)	Member
Asstt. Security Officer	Member
Two Students Representatives	Member

3. The Internal Complaints Committee under the provisions of "The Sexual Harassment of Women at work place (Prevention, Prohibition and Redressal) Act 2013 is constituted as under for our Institute:

Prof. RoohieNaaz Prof. CSE Department	Chairperson
Prof. A.H. Bhat Prof. Electrical Engineering	Member
Dr. A. Rehman Materials and Metallurgical Engg. Deptt.	Member
Dr. HamidaChisti Associate Professor Chemistry	Member
Adv. HumairaShafi	External Member
Mrs. NaziaNazir DR Accounts	Member Secretary

4. SC/ST/PWD/OBC/ Cell Committee

Dr M Y Shah	Chairperson
Dr ShrikantMaktedar	Member
Dr Ravi Bhushan	Member
Dr. KurellaSwamy	Member
Dr ChilakaRanga	External Member
Dr FarhadIllahiBaksh	Member Secretary

10.1.5 Delegation of financial powers (5)

Claimed 5

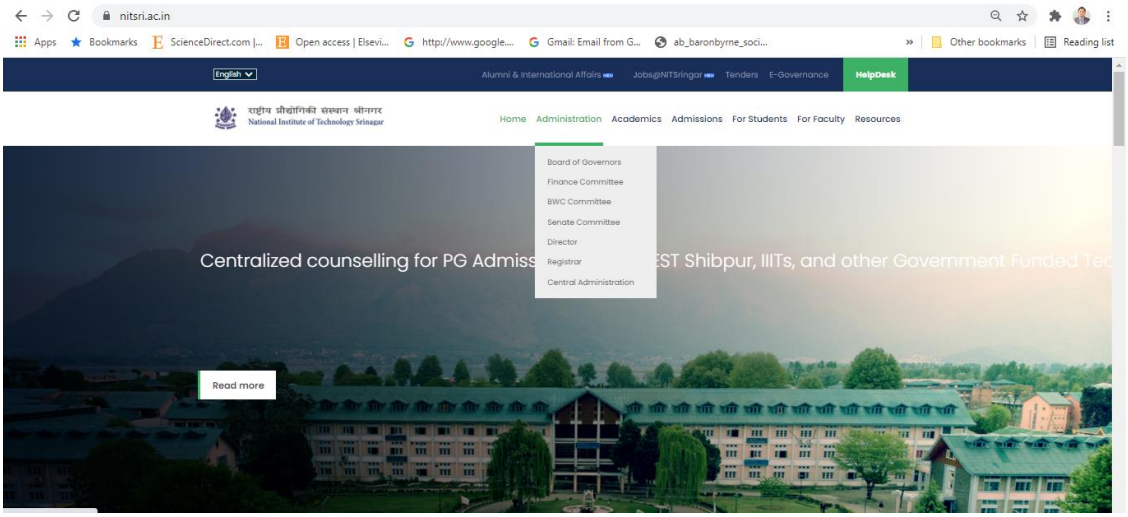
The Accounts of the Institute are in the name of Director. He is empowered to sanction the requisite amount of money/ proposes uptoRs. 25.00 Lacs beyond this amount the proposal needs to be approved by Chairman BOG. The financial Cheques /transactions are jointly signed by Director and the Registrar.

Further, the HOD's/HOC's are delegated to spend Rs. 15,000/- for purchase of consumables and repairs for smooth running of the departments/centres.

10.1.6 Transparency and availability of correct/ambiguous information in public domain (5)

Claimed 5

The Institute has a dynamic website and all the relevant information is placed on the Institute Website www.nitsri.ac.in for the information of Public.



10.2 Budget Allocation, Utilization and Public Accounting at Institute level. (15) **Claimed 15**

10.2.1. (A) Quantum of Budget Allocation for Three Years (Rs. in Rupees) (5) **Claimed 5**

Financial Year 2019-20

Total Income 1,44,84,79,807.00				**Actual Expenditure 1,22,57,00,000.00**			**Total No of students**
Fee	Govt.	Grants	Other Sources. 1.Interest on investment 2.Misc.Income	Recurring Expenditure including Salary	Non-Recurring Expenditure	Special Project/Any other	Expenditure per student
14,70,11,344.00	0	1,21,69,00,000.00	8,45,68,463.00	97,42,00,000.00	25,15,00,000.00	0	**4,71,423.00**

Financial Year 2018-19

Total Income 2,12,89,38,557.00				**Actual Expenditure 1,49,76,40,049.00**			**Total No of students**
Fee	Govt.	Grants	Other Sources. 1.Interest on investment 2.Misc.Income	Recurring Expenditure including Salary	Non-Recurring Expenditure	Special Project/Any other	Expenditure per student
13,49,81,363.00	0	1,91,59,00,000.00	7,80,57,194.00	1,02,64,35,768.00	47,12,04,281.00	0	**5,69,228.45**

Financial Year 2017-18

Total Income 1,58,21,25,490.00				**Actual Expenditure 1,61,71,95,384.00**			**Total No of students**
Fee	Govt.	Grants	Other Sources 1.Interest on investment 2.Misc.Income	Recurring Expenditure including Salary	Non-Recurring Expenditure	Special Project/Any other	Expenditure per student
17,35,67,108.00	0	1,30,90,00,000.00	9,95,58,382.00	84,27,47,542.00	77,44,47,842.00	0	**6,06,827.53**

Table B.10.2.1

10.2.2 Utilization of Allocated Funds (5)

Claimed 5

A. Budget utilization for three years (Rs. in crores):

Financial Year	Budget (INR)	Expenditure (INR)	Percentage of Utilization
2019-20	121.69 crores	122.57 crores	100.72%
2018-19	191.59 crores	149.76 crores	78.16%
2017-18	130.90 crores	147.14 crores	112.40%

Table B.10.2.2

The Funds allocated have been well utilized for:

- Developing lab facilities.
- Additional labs were setup.
- New equipments were added to different labs.
- Library and Internet facilities were improved.
- Maintenance of workshop and lab equipments.
- Training programs for faculty members and non-teaching staffs.
- Extracurricular activities of students.

Items	BUDGETED IN 2019-20 (INR)	EXPENSES IN 2019-20 (INR)	BUDGETED IN 2018-19 (INR)	EXPENSES IN 2018-19 (INR)	BUDGETED IN 2017-18 (INR)	EXPENSES IN 2017-18 (INR)
Infrastructure Build up	800.00 Lacs	795.00 Lacs	2000 Lacs	1791.69 Lacs	5750 Lacs	6105.83 Lacs
Library	300.00 Lacs	275.00 Lacs	300.00 Lacs	425.13 Lacs	335.00 Lacs	325.00 Lacs
Laboratory equipment	1415.00 Lacs	1445.00 Lacs	2824.00 Lacs	2492.22 Lacs	980.00 Lacs	977.78 Lacs
Lab consumable	33.50 Lacs	33.83 Lacs	80.00Lacs	60.00Lacs	70.00 Lacs	69.03Lacs
Teaching and Non Teaching Salary	8739.00 Lacs	6976.06 Lacs	5562.00 Lacs	4319.86 Lacs	4180.00 Lacs	4358.69 Lacs
Maintenance And Spares	45.00 Lacs	30.29 Lacs	230.00 Lacs	105.00 Lacs	240.00 Lacs	35.72 Lacs
R&D			--	--	---	---
Training and Travel	60.00 Lacs	52.43 Lacs	65.00Lacs	35.00Lacs	60.00 Lacs	24.33 Lacs
Misc. Expenses*	1200.00 Lacs	955.89 Lacs	1350.00Lacs	1165.00Lacs	1225.00	975.00
Computer Software			280.00 Lacs	255.40 Lacs	250.00 Lacs	245.00 Lacs
Total	**12,592.50 Lacs**	**10,563.50 Lacs**	**12,691 Lacs**	**10,649.3 Lacs**	**13,090 Lacs**	**13,116.38 Lacs**

Table B.10.2.2a

10.2.3. Availability of Audited Statements on the Institute Website. (5)

Claimed 5

A. Availability of Audited Statement on website

The Audited statements for the last three years are available on the Institute Website www.nitsri.ac.in.

10.3 Programme specific Budget Allocation, Utilization (30)

10.3.1. (A) Quantum of Budget Allocation for Three Years (Rs. in Lacs):

Financial Year	Departments	Budget (INR)			Expenditure (INR)		
		Non-Recurring	Recurring	Total Budget	Non-Recurring	Recurring	Actual Budget
2019-20	Civil Engg. Deptt.	150.00	18.00	168.00	110.00	18.00	128.00
	Chemistry Deptt.	50.00	3.50	53.50	30.00	2.10	32.10
	Computer Science & Engg.	150.00	4.50	154.50	85.00	4.70	89.70
	Chemical Engg. Deptt.	150.00	7.00	157.00	95.00	6.0	101.00
	Electrical Engg. Deptt.	150.00	8.00	158.00	85.00	6.00	91.00
	Electronics &Comm.Engg.	150.00	7.00	157.00	70.00	4.50	74.50
	Humanities Deptt.	10.00	0.50	10.05	8.00	0.50	8.50
	Information Technology	150.00	4.50	154.50	45.00	4.25	49.25
	Mechanical Engg. Deptt.	150.00	13.00	163.00	120.00	8.48	128.48
	Mett. & Materials	150.00	6.00	156.00	45.00	5.75	50.75
	Mathematics Deptt.	50.00	0.50	50.50	40.00	0.50	40.50
	Physics Deptt.	50.00	3.00	53.00	25.00	3.05	28.05
	Total			1435.05	Total		821.83
2018-19	Civil Engg. Deptt.	20	10	30.00	11	2	13.00
	Chemistry Deptt.	3	1	4.00	1.5	0.5	02.00
	Computer Science & Engg.	12	2	14.00	4.2	1.8	06.00
	Chemical Engg. Deptt.	12	2	14.00	4.5	1.5	06.00
	Electrical Engg. Deptt.	14	4	18.00	6.0	2	08.00
	Electronics &Comm.Engg.	14	4	18.00	6	2.39	08.39

	Humanities Deptt.	1.5	0.5	02.00	0.75	0.25	01.00
	Information Technology	12	2	14.00	4	2	06.00
	Mechanical Engg. Deptt.	20	6	26.00	8.76	3.34	12.00
	Mett. & Materials	12	2	14.00	4.75	1.25	06.00
	Mathematics Deptt.	1.5	0.5	02.00	0.65	0.35	01.00
	Physics Deptt.	2.75	1.25	04.00	1.5	0.5	02.00
	Total			**160.00**	**Total**		**71.39**
2017-18	**Civil Engg. Deptt.**	18	6	24.00	12	4	16.00
	Chemistry Deptt.	3	1	04.00	1.5	0.5	02.00
	Computer Science & Engg.	10	2	12.00	8	2	10.00
	Chemical Engg. Deptt.	9.5	2.5	12.00	8.5	1.5	10.00
	Electrical Engg. Deptt.	13	3	16.00	8.5	3.5	12.00
	Electronics &Comm.Engg.	13.5	2.5	16.00	8	4	12.00
	Humanities Deptt.	1.5	0.5	02.00	0.75	0.25	01.00
	Information Technology	9	3	12.00	6	2	08.00
	Mechanical Engg. Deptt.	19	5	24.00	11	4.55	15.55
	Mett. & Materials	9.5	2.5	12.00	5.5	2.5	08.00
	Mathematics Deptt.	1.25	0.75	02.00	0.75	0.25	01.00
	Physics Deptt.	2.75	1.25	04.00	1.5	0.5	02.00
	Total			**140.00**			**97.55**

Table B.10.3.1a

10.3. Program Specific Budget Allocation, Utilization (Rs. in Lacs): (30)

Claimed 30

Items	Budgeted 2019-20	Expenses 2019-20	Budgeted 2018-19	Expenses 2018-19	Budgeted 2017-18	Expenses 2017-18
Laboratory equipment	150.00	120.00	15.00	7.50	14.00	8.50
Computer Software			--	--	2.00	--
Lab consumable	5.00	3.48	5.00	2.50	4.00	3.50
Maintenance & Spares	8.00	5.00	4.00	2.00	4.00	3.55
R&D			---	--	--	--
Training and Travel				---	--	--
Misc. Expenses*			2.00	---	--	--
Total	**163.00**	**128.48**	**26.00**	**12.00**	**24.00**	**15.55**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	110.00	18.00	07.00	13.00	09.00
Computer Software			--	--	--	--
Lab consumable	10.00	12.00	10.00	05.00	09.00	05.50
Maintenance & Spares	8.00	6.00	02.00	01.00	02.00	01.50
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**168.00**	**128.00**	**30**	**13**	**24**	**16**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	85.00	10.00	03.00	09.00	6.50
Computer Software			04.00	03.00	3.50	2.00
Lab consumable	4.00	3.50	03.00	01.50	2.50	1.50
Maintenance & Spares	5.00	3.50	01.00	0.50	1.00	2.00
R&D			---	--	--	--
Training and Travel			--	---	--	--

Misc. Expenses*			---	---	--	--
Total	**159.00**	**91.00**	**18**	**8**	**16**	**12**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	95.00	6.00	3.00	7.00	6.00
Computer Software			3.50	1.75	---	--
Lab consumable	3.00	3.50	2.50	0.75	3.50	2.50
Maintenance & Spares	4.00	2.50	2.00	0.50	1.50	1.50
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**157.00**	**101.00**	**14**	**6**	**12**	**10**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	70.00	10.00	5.39	10.00	7.50
Computer Software			4.00	---	4.00	3.25
Lab consumable	4.00	2.80	3.50	1.75	2.00	1.25
Maintenance & Spares	3.00	1.70	0.50	1.25	--	--
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**157.00**	**74.50**	**18.00**	**8.39**	**16.00**	**12.00**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	85.00	9.00	3.70	8.00	7.00
Computer Software			3.00	2.30	2.50	2.00
Lab consumable	1.50	2.00	1.25	--	1.50	0.50
Maintenance & Spares	3.00	2.70	0.75	--	--	0.50
R&D			---	--	--	--
Training and Travel			--	---	--	--

Misc. Expenses*			---	---	--	--
Total	**154.50**	**89.70**	**14.00**	**6.00**	**12.00**	**10.00**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	45.00	8.00	3.70	7.00	7.00
Computer Software			4.00	2.30	3.50	2.00
Lab consumable	1.50	1.75	1.25	--	1.50	0.50
Maintenance & Spares	3.00	2.50	0.75	--	--	0.50
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**154.50**	**49.25**	**14.00**	**6.00**	**12.00**	**8.00**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	150.00	45.00	8.00	3.70	7.00	5.00
Computer Software			2.00	--	--	--
Lab consumable	3.00	2.95	2.25	2.30	3.50	1.50
Maintenance & Spares	3.00	2.80	1.75	--	1.50	1.50
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**156.00**	**50.75**	**14.00**	**6.00**	**12.00**	**8.00**

Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	50.00	25.00	2.25	0.50	1.25	--
Computer Software			--	--	--	--
Lab consumable	1.00	1.75	1.00	0.50	2.00	0.50
Maintenance & Spares	2.00	2.50	0.75	--	0.75	0.50

R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**53.00**	**28.05**	**4.00**	**1.00**	**4.00**	**1.00**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	50.00	30.00	2.25	1.50	1.25	1.00
Computer Software			--	--	--	--
Lab consumable	1.50	0.60	1.00	0.50	2.00	0.50
Maintenance & Spares	2.00	1.50	0.75	--	0.75	0.50
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total			**4.00**	**2.00**	**4.00**	**2.00**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	50.00	40.00	--	--	1.50	0.75
Computer Software			1.50	0.75	--	--
Lab consumable	0.50	0.50	--	--	--	--
Maintenance & Spares	2.00		0.50	0.25	0.50	0.25
R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**52.50**	**40.50**	**2.00**	**1.00**	**2.00**	**1.00**
Items	**Budgeted 2019-20**	**Expenses 2019-20**	**Budgeted 2018-19**	**Expenses 2018-19**	**Budgeted 2017-18**	**Expenses 2017-18**
Laboratory equipment	10.00	8.00	1.50	--	1.50	0.75
Computer Software			--	0.75	--	--
Lab consumable	0.50	0.50	--	--	--	--
Maintenance & Spares	2.00		0.50	0.25	0.50	0.25

R&D			---	--	--	--
Training and Travel			--	---	--	--
Misc. Expenses*			---	---	--	--
Total	**12.50**	**8.50**	**2.00**	**1.00**	**2.00**	**1.00**

Table B.10.3.1b

10.3.1.(B) Adequacy of budget allocation (10)

Claimed 10

- As per the requirement of Institute New Labs were established and New Equipment's and accessories had to be procured.
- New Facilities were introduced for extension programmes of R&C Wing.
- Existing labs were upgraded and improved for ambience and facilities.
- Purchase of New Software's and Renewal of Software already exists.
- Purchase of E-Resources, E-Books and E-Journals.
- Faculty members were encouraged to attend faculty development programmes.
- Trainings programmes for non-faculty staff were held for upgradation of soft skill.

10.3.2. Utilization of Allocated Funds (Rs. in crores) (20):

Claimed 20

Financial Year	Budget (INR)	Expenditure (INR)	Percentage of Utilization
2019-20	121.69 crores	122.70 crores	100.70%
2018-19	191.59 crores	149.76 crores	78.16%
2017-18	130.90 crores	147.14 crores	112.40%

Table B.10.3.2

The funds allocated have been well utilized for:

- Developing of lab facilities and upgradation of existing facilities.
- Purchase of equipment's for different labs
- Library resources and internet facilities
- Workshop maintenance and lab consumables.
- Training of faculty and non-faculty.

10.4. Library and Internet (20)

Claimed 20

The NIT Srinagar library, LIRC supports the Teaching, Research & and other related programs of the institute. The library has a good collection of documents that comprises of Books,
Journals, Theses, Video cassettes, Learning Resources (LRs)& Compact discs in the field of Engineering, Science, Management, and Literature & Humanities.
The library has computerized data of whole of its collection using **KOHA software** and is in the process of automating all library operations.

Library Established in	1960
Library Members	4000
Number of Books	68248
Reprographic facility	Xeroxing
Data usage of the library	70-80% (in terms of Books issued to faculty& students and E-resources used)
Annual Budget	3crore
Timing during working days	8.45 am to12 pm
Timing on Sundays &Holidays	10am to 5pm

Table B. 10.4

- **Layout and Floor plan**
  - **Ground Floor: The ground floor houses the following important sections.**
    - Periodical section
    - Circulation section
    - Conference Hall
    - Acquisition Section/Processing Section
    - Stacks I
    - Assistant Librarians Room
    - Dy. Librarian's room
    - Office
    - Automation section
  - **First Floor: The first floor houses the following important sections.**
    - Textbook & Reference section
    - Reading cum browsing Hall
    - Stacks II
  - **Second Floor**
    - Back Volume Section/ ST, SC Section

- **Library Mission:**
  - To promote the technical knowledge
  - Generation and application of knowledge & resources
  - Effective dissemination of knowledge.
  - Library automation and networking for remote access of online electronic resources.
  - Improve the library resources.
  - Enhance the student experience.
  - Build the digital research environment.
  - Provide convenient and customized access to information Library Resources

- **Library Resources:**

The library has a wide range of resources on engineering, sciences, humanities & Social Sciences.

Collection	**Size (number)**
Books	68248
Bound volumes of journals	10070
Video cassettes	496
Learning Resources	36
Compact discs	650

Books in Text book section	10037
Books in stacks section	58211
Books in SC, ST section	9898

Table B.10.4b

Year	Number of New Titles Added
2017-2018	164
2018-2019	7447
2019-2020	2249

Table B.10.4c

10.4.1. Quality of Learning Resources (10)

Claimed 10

E-Library (Electronic/On-line resources/e-resource)

E-library provides collaborative search of all type of e-resources/on-line resources such as e-journals and books

- **E-Books**

Central library procured different type of e-books, online books for students and faculty via IP range in the campus. The different departments can also be access various type of e-books such as text books and reference books in the electronic form.

- **Wiley**

Subjects Covered	URL	Total cost
Civil Engineering & Construction, Electronics &Electrical Engg, Computer Science &IT, Chemistry &Chemical Engg, Physics, Maths& Statistics &Mechanical Engineering.	onlinelibrary.wiley.com Year 2016 &2017 No Of Titles 829	$88,694

Table B.10.4.1a

- **Springer Nature**

Subjects Covered	URL	Total Cost
Chemistry & Materials Science, Computer Science, Engineering, Mathematics &Statisticscs, Physics &Astronomy	link.springer.com/openurl?genre=book&isbn=978-1-4471-6807-2 Year 2016 No. Of Titles 3298	€52,759.20

Table B.10.4.1b

- **Elsevier**

Subjects Covered	URL	Total Cost
Chemical Engineering, Chemistry, Engineering, Materials Science, Mathematics, Physics& Astronomy, Computer Science	sciencedirect.com Year 2016 No. Of Titles 493	$102136

Table B.10.4.1c

- **Pearson**

Subjects Covered	URL	Total Cost
Chemistry, Civil Engineering, Computer Science & IT, Electronic Telecommunication, Mathematics, Mechanical Engineering, Physics	lib.myilibrary.com Year 2014-2017 No. Of Titles 312	INR 15.64059

Table B.10.4.1d

- **E-Journals**

- **E-Resources are accessible to our Institute through eShodhSindhu (eSS)**

E-resources	E-resources Subscription Period
ACM Digital Library	January2020 toDecember2021
ASCE Journals	January2020 toDecember2021
ASME Journals Online	January2020 toDecember2021
Economic & Political Weekly	April 2021 to March 2022
Institute for Studies in Industrial Development	April 2021 to March 2022
JGatePlus(JCCC)	January2020 to December 2021
Oxford University Press	April 2020 to March 2022
Springer Link 1700 Collection+ Nature Journals	April 2021 to March 2022
Web of Science Lease Access	January2020 to December2021

Table B.10.4.1e

- **NDL e Resources**

1. World E-Book Library Available through NDLI (National Digital Library of India)
2. South Asia Archives (SAA), National Licensing (perpetual)

- **URKUND Plagiarism software** National Licensing

Back Files of Science Direct Journals from M/S **Elsevier** on the following subjects are now available from **Vol.1, Issue1**up to the year **1994.**

Subjects Covered	Year	URL	Total Cost
Engineering &Technology	Pre 1995	sciencedirect.com	**$1,93,874**
Materials Science	,,	,,	
Chemical Engineering	,,	,,	
Computer Science	,,	,,	
Inorganic Chemistry	,,	,,	
Organic Chemistry	,,	,,	
Mathematics	,,	,,	
Business Management Accounting	,,	,,	

Table B.10.4.1f

E-Resources subscribed by the Institute (2019-2020)

Subjects Covered	URL	Total Cost
Science Direct (8 subject collection) Jan 2020- Dec 2020	www.sciencedirect.com/	USD 86,441.22
IEEE/IET Electronic Library (IEL) online Jan 2019-Dec. 2018	http://ieeexplore.ieee.org/	INR 18,97,693.10
SCOPUS Jan 2020- Dec 2020	www.elsevier.com	USD 11,787.50
TURNITIN (Plagiarism software)		INR 7,000,00

Table B.10.4.1g

- **BIS &ASTM Standards on our IP range.**

Subjects Covered	URL	Total Cost
BIS	http://standards.bsb.co.in/	INR 12,48,345.60 (for 3 Years)
ASTM	http://compass.astm.org	INR 7,44,420.44

Table B.10.4.1h

SERVICES

- **Membership**

  All the students, faculty members, research scholars & administrative staff can register themselves for the membership of the library. The membership form is available at the circulation counter and the same is required to be attested by the Head of the Department/Section.

The number of books borrowed by users is as follows:

Category	Number of Books	Duration
Faculty	10	30 days
Research Scholar	05	15 days
Student	03	15 days
Supporting Staff	02	15 days

Table B.10.4.1i

- **Text Book & Reference Section**

The textbook and reference section remains open from 8.45 a.m.to 9.30p.m. on all working days and from 10.a.m. to 4.00 p.m. on weekdays & holidays. The books available in this section can be consulted in the library only.

- **Stacks section**

The books available here are meant to be issued to the faculty, students, research scholars and other readers as per the criteria given in the library rules.

- **Video Library**

The library has collection of video cassettes, CDs, & LRs.

- **Photo copying facility**

The photocopying facility is provided to all students and faculty at subsidized rates.

- **Search**

OPAC (Online public access catalogue), Science Direct, E-Resources, Video library

- **RFID facility**

- Library and Information Resource Centre is currently being remodelled into a smart library. All the supporting Hardware (OPAC Kiosk's, Book Check-in/Check-Out Kiosks, Server's, Intra- Net, Networked Thermal Printers, Smart Staff Stations) and Software

(Koha Server, Windows Server, Linux Server, RFID server) is already up and running.The library is also equipped with a wireless security gate that can alert the staff of any unauthorized checkouts whereas 2 high density data servers are running 24*7 in the library.

- **Lib website:** The library provides the updates to the patrons via the library webpage https://nitsri.ac.in/Department/Deptindex.aspx?page=a&ItemID=io&nDeptID=ck
- **Library programs/activities:**User awareness webinars and workshops are continuously organised by LIRC.

➢ **Our Team**

Ms.Asmat Ali	Deputy Librarian M 9797847219, Deputylibrarian@nitsri.net
Technical Asstt. (SG)	Mrs Saymee
Technical Asstt	Mrs Tahira
Technical Asstt	Mr. M Y Rather
Assistant(SG)	Mrs.Dilshada
Assistant(SG)	Mrs.Neelofar
Jr. Lib assistant	MrShabir Ahmad Sheikh
Orderly	Mr.Noor Mohammad
Contractual	Six

Table B.10.4.1j

Library committee

Sl. No.	Members of the Library Committee	Department	Responsibility
1.	Prof.Ajaz Ahmed Zargar	Electronics and Communication	Chairman Library Committee
2.	Ms. Asmat Ali	Library	Deputy Librarian
3.	Dr. M. Zubair Ansari	Physics	Member
4.	Dr. S. A. Shah	Chemistry	Member
5.	Dr. Ranjeet Kumar Rout	Computer Science and Engineering	Member
6.	Dr. IrfanSamadWani	Metallurgical & Materials Engineering	Member
7.	Dr. M S Charoo	Mechanical Engineering	Member
8.	Dr. Malik Perveez	Chemical Engineering	Member

9.	Dr M AdilBazaz	Electrical engineering	Member
10.	Prof.Nayaz Ahmad	Mathematics	Member
11.	Dr. Prince Ahmad	Physics	Member
12.	Mr. Janibul Bashir	IT	Member
13.	Prof Mir Mukhtar		Member

Table B.10.4.1k

10.4.2 Internet (10)

Claimed 10

- **Internet Connection Details**

Name of the Internet Provider	NIC NKN; BSNL
Available Bandwidth	NIC NKN :1 GBPS (1:1) & BSNL: 250 Mbps
Wi-Fi Availability	YES
Internet access in labs classrooms library and offices of all departments	YES
SECURITY ARRANGEMENT	YES, HARDWARE FIREWALL

Table B.10.4.2a

- **Wi-Fi Details**

NIT Srinagar is a Wi-Fi enabled campus with its access controlled by hardware Firewall installed in Computer Service Centre and Wi-Fi access points in various departments including both Boys and Girls hostels.

Device	Department	Coverage
Cisco Access Points	Computer Service Centre(3)	50 Meters radius without obstructions
Dlink Access Points	Direction Office (2)	50 Meters radius without obstructions
Dlink Access Points	CSE Staff Room (1)	50 Meters radius without obstructions
Dlink Access Points	Training & Placement Cell (4)	50 Meters radius without obstructions
Cisco Access Points	IT Building(3)	50 Meters radius without obstructions
Dlink Access Points	Humanities Department (1)	50 Meters radius without obstructions
Dlink Access Points	Physics Department (1)	50 Meters radius without obstructions
Dlink Access Points	Medical Unit (1)	50 Meters radius without obstructions
Cisco Access Points	Guest House (2)	50 Meters radius without obstructions
Dlink Access Points	Boys Hostels (92) Girls Hostels (15)	50 Meters radius without obstructions
Dlink Access Points	Campus Wifi (Outdoor) (130)	50 Meters radius without obstructions
Cisco Access Points	CSE Building (6)	50 Meters radius without obstructions
Cisco Access Points	Admin Building (04)	50 Meters radius without obstructions

Cisco Access Points	Civil, Electrical, Physics, Chemistry &Mathematics Building (18)	50 Meters radius without obstructions
Cisco Access Points	EM&R (1)	50 Meters radius without obstructions
Cisco Access Points	PG Block	50 Meters radius without obstructions
Cisco Access Points	Girls Hostel (3)	50 Meters radius without obstructions
Cisco Access Points	Chemistry Department (2)	50 Meters radius without obstructions
Cisco Access Points	MMED Department (1)	50 Meters radius without obstructions
Cisco Access Points	Old E&C Building (1)	50 Meters radius without obstructions

Table B.10.4.2b

- **Security Details**

S.No	Device	Function
1	Sophos Firewall XG750 Full Guard Plus (Hardware)	Security Controller
2	Quick Heal (Seqrite) Antivirus Endpoint Software 17.00 (64-bit)	Anti-Virus

Table B.10.4.2c

National Institute of Technology Srinagar

राष्ट्रीय प्रौद्योगिकी संस्थान श्रीनगर
हज़रतबल | श्रीनगर | जम्मू और कश्मीर | 190006
www.nitsri.ac.in

Professor Rakesh Sehgal
Director

No.: NIT/Dir/24/478

Date: 16.06.2021

Part - C

DECLARATION

I undertake that, the institution is well aware about the provisions in the NBA's accreditation manual concerned for this application, rules, regulations, notifications and NBA expert visit guidelines in force as on date and the institute shall fully abide by them.

It is submitted that information provided in this Self-Assessment Report is factually correct. I understand and agree that an appropriate disciplinary action against the Institute will be initiated by the NBA, in case any false statement/information is observed during pre-visit, visit, post visit and subsequent to grant of accreditation.

16/06/2021

Prof. (Dr.) Rakesh Sehgal

Director
National Institute of Technology
Srinagar (J&K)