CRITERION 2	Program Curriculum and Teaching-Learning Processes	94/100

2.1 Program Curriculum

2.1.1 State the process for designing the program curriculum (8/10)

The program curriculum is designed based on the broad guidelines of the Institute, keeping in view other NITs, MHRD directives, and program-specific criteria to meet the requirements of POs and PEOs of the Department. Industry persons, alumni and students are consulted while the curriculum is being designed. Technological developments constitute an essential criterion while developing the program curriculum. The faculty members develop the course content to meet the requirement of COs. The individual courses are discussed specifically for their outcomes in faculty board meetings and the Department Undergraduate Committee (DUGC) meetings. The DUGC discusses the contents of the curriculum threadbare. The committee points out the deficiencies of the curriculum keeping in view the various inputs and returns the same to the faculty for review. Once the DUGC is satisfied with the contents of the curriculum, it is submitted to the Senate Undergraduate Committee (SUGC)). The SUGC evaluates the curriculum in terms of POs, PEOs, and various inputs. Finally, the program curriculum is submitted to the institute senate, which is the highest academic body of the institute. The director, NIT Srinagar, chairs the senate of the NIT Srinagar. The senate comprises members drawn from the various departments of the institute. In addition to the institute members, it has members from outside the institute. At least one member is alumni and others from other institutes of repute. The presence of outsiders and alumni ensures 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 2.1a.

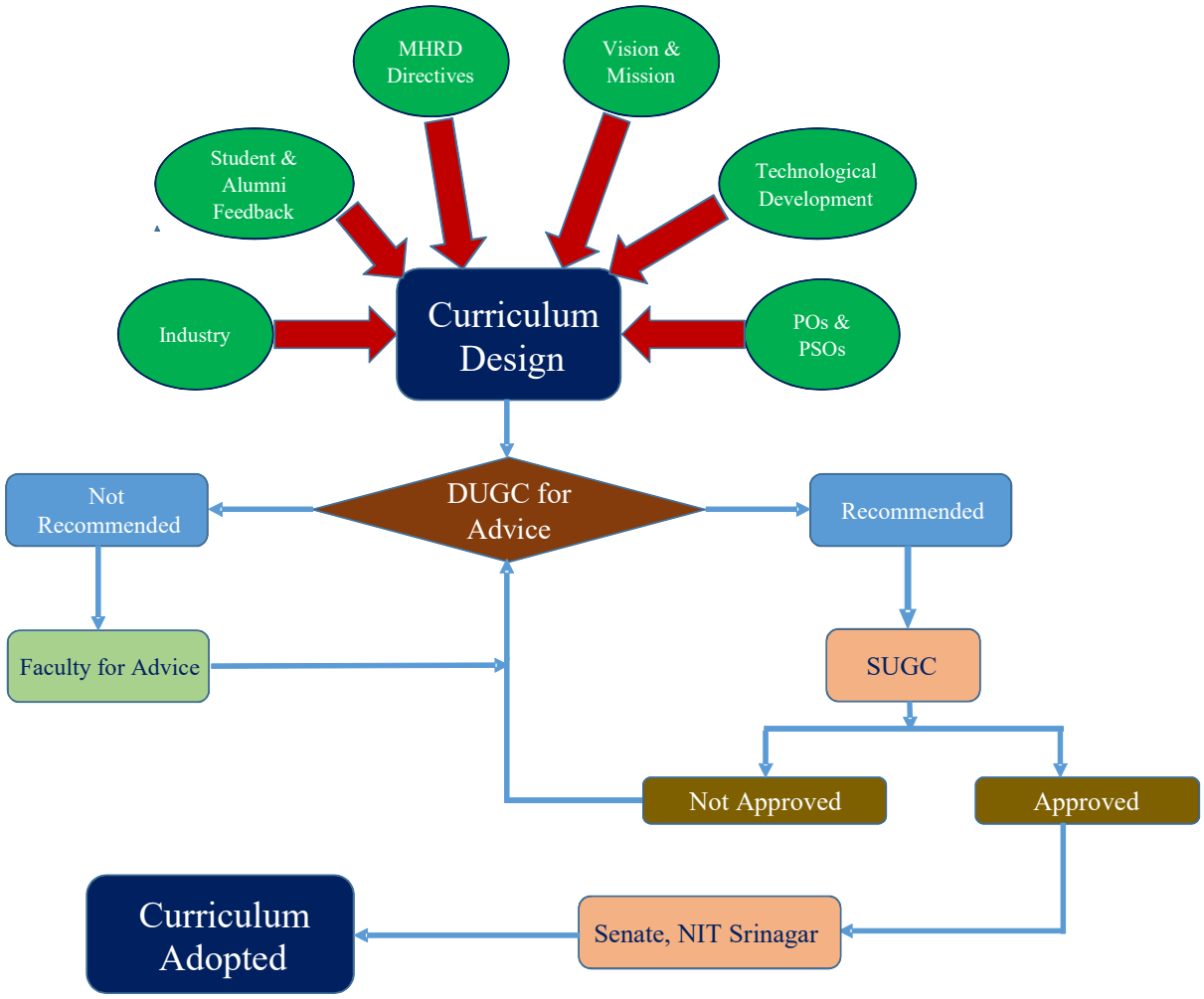


Figure 2.1: Process of designing the programme curriculum

2.1.2 Structure of the Curriculum (5/5)

Scheme (Up to Spring 2019)

SEM	Course Code	Course Title	Total Number of contact hours				Credits
			L	T	P	Total	
1st	PHY 101	Physics	2	1	0	3	3
	PHY 102 P	Physics Lab I	0	0	2	2	1
	CHM 101	Chemistry	3	1	0	4	4
	CHM 101L	Chemistry Laboratory I	0	0	2	2	1
	IT101	Computer Fundamentals	3	0	0	3	4
	CIV 102	Engineering Drawing	2	0	4	6	4
	HSS 101	Communication Skills & Presentation	1	1	0	2	4
	MTH 101	Mathematics I	3	2	0	5	4
	WSP I	Workshop Practice I	1	0	3	4	2
	Total		**15**	**5**	**11**	**31**	**27**

2nd	CHM 201	Chemistry II	3	1	0	4	4
	CHM 201L	Chemistry Laboratory II	0	0	2	2	1
	CSE 201	Computer Programming	3	0	0	3	3
	CSE 202P	Computer Programming Lab	0	0	2	2	1
	CIV 201	Engineering Mechanics	2	0	4	6	4
	HU 201	Introduction to Social Sciences	4	0	0	4	4
	MTH 201	Mathematics II	3	1	0	4	4
	MEC 201	Machine Drawing	1	0	3	4	3
	PHY 201T	Physics Theory	2	1	0	3	3
	PHY 202P	Physics Lab II	0	0	2	2	1
	Total		**18**	**3**	**13**	**34**	**28**
3rd	MEC 301	Fundamental Dynamics	2	1	0	3	3
	MEC 302	Mechanics of Materials-I	3	1	0	3	3
	MEC303	Fluid Mechanics	2	1	0	3	3
	MEC304	Engineering Thermodynamics	2	1	0	3	3
	MEC305	Manufacturing Technology	2	1	0	3	3
	MEC306	Engineering Graphics & Computer Modelling	0	0	6	3	3
	MTH 304	Mathematics	2	0	0	4	2
	MEC302P	Mechanics of Materials-I Lab	0	0	2	2	1
	MEC303P	Fluid Mechanics Lab	0	0	2	2	1
	MEC305P	Manufacturing Technology-I Lab	0	0	2	2	1
	Total		**13**	**5**	**12**	**28**	**23**
4th	MEC 401	Materials Science	2	1	0	3	3
	MEC 402	Mechanics of Materials-II	3	1	0	4	4
	MEC 403	Theory of Machines-I	3	1	0	4	4
	MEC 404	Applied Thermodynamics-I	2	1	0	3	3
	MEC 405	CAM & Industrial Automation	3	1	0	4	4
	ELE 406	Electrical Engineering Technology	2	1	0	3	3
	MEC 403P	Theory of Machines-I Lab	0	0	2	2	1
	MEC 404P	Applied Thermodynamics-I Lab.	0	0	2	2	1
	MEC 405P	CAM & Industrial Automation lab	0	0	2	2	1
	ELE 407P	Electrical Engineering Technology Lab	0	0	2	2	1
	Total		**15**	**6**	**8**	**29**	**25**
5th	MEC 501	Theory of Machines-II	3	1	0	4	4

	MEC 502	Machine Design-I	3	1	0	4	4
	MEC 503	Hydraulic Machinery	2	1	0	3	3
	MEC504	Heat Transfer	2	1	0	3	3
	MEC505	Industrial Engineering-I	3	1	0	4	4
	ECE 508	Industrial Electronics	2	1	0	3	3
	MEC 501P	Theory of Machines-II Lab	0	0	2	2	1
	MEC 504P	Heat Transfer Lab	0	0	2	2	1
	MEC 505P	Industrial Engineering-I Lab	0	0	2	0	0
	ECE 508P	Industrial Electronics Lab	0	0	2	2	1
	Total		**15**	**6**	**8**	**27**	**24**
6th	MEC 601	Automatic Control	3	1	0	4	4
	MEC 602	Machine Design-II	3	1	0	4	4
	MEC 603	Fundamentals of Tribology	3	1	0	4	4
	MEC 604	Linear Optimization in Engineering	3	1	0	4	4
	MEC 605	Introduction to Mechatronics	3	1	0	4	4
	MEC 606	Seminar	0	0	6	6	3
	MEC 603P	Fundamentals of Tribology Lab	0	0	2	2	1
	MEC 605P	Mechatronics Lab	0	0	2	2	1
	Total		**15**	**5**	**10**	**30**	**25**
7th	MEC 701	Basic Fracture Mechanics	2	1	0	3	3
	MEC 702	Measurements and Instrumentation	3	1	0	4	4
	MEC 703	Industrial Engineering-II	3	1	0	4	4
	MEC 704	Applied Thermodynamics-II	3	1	0	4	4
	MEC705	Computer Applications in Mech. Engg. (CAME)	2	1	0	3	3
	MEC703P	Industrial Engineering-II Lab	0	0	2	2	1
	MEC 705P	CAME Lab.	0	0	2	2	1
	MEC 706	Final Year Project	0	0	6	6	3
	MEC 707	Practical Training & Professional Viva	0	0	0	0	2
	Total		**13**	**5**	**10**	**21**	**18**
8th	MEC 801	Production & Operations Management	3	1	0	4	4
	MEC 802	Internal Combustion Engines	3	1	0	4	4
	MEC 803	Departmental Elective-I	2	1	0	3	3
	MEC804	Departmental Elective-II	2	1	0	3	3
	MEC 805	Final Year Project	0	0	20	20	10
	MEC 802P	I.C.Engine Lab	0	0	2	2	1
	Total		**10**	**4**	**22**	**36**	**25**

Elective –I		Elective -II	
Course No.	Course name	Course No.	Course name
MEC80*	Value Engineering	MEC80*	Power Plant Engineering
MEC80*	Theory of Elasticity	MEC80*	CAD of Thermal Systems
MEC80*	Introduction to Acoustics	MEC80*	Introduction to MEMS
MEC80*	Continuum Mechanics	MEC80*	

Table B. 2.1. Curriculum structure
Revised Scheme (Autumn 2019 onwards)

Sem	Course Code	Course Title	Total Number of contact hours				Credits
			L	T	P	Total	
1st	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	Workshop Practice	0	0	5	5	2
	Total		**15**	**6**	**9**	**30**	**25**
2nd	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**	**25**
3rd	MET201	Manufacturing Processes	**3**	**1**	**0**	**4**	**4**
	MET202	Mechanics of Solids	**3**	**0**	**0**	**3**	**3**

	MET203	Fundamentals of Dynamics	3	0	0	3	3
	MET204	Engineering Thermodynamics	3	1	0	4	4
	MET205	Fluid Mechanics - I	3	1	0	4	4
	MAT2XX	Applied Mathematics for Engineers	3	0	0	3	3
	MEL201	Machine Drawing &Solid Modelling	0	0	4	4	2
	MEL202	Mechanics of Solids Lab	0	0	2	2	1
	MEL203	Manufacturing Processes Lab	0	0	2	2	1
	Total		**18**	**3**	**8**	**29**	**25**
4th	MET251	Applied Thermodynamics	3	1	0	4	4
	MET252	Mechanics of Materials	3	1	0	4	4
	MET253	Theory of Mechanisms and Machines	3	1	0	4	4
	MET254	Materials Science and Engineering	3	1	0	4	4
	MET255	Non-Traditional Machining and Automation	3	1	0	4	4
	ECT2XX	Basic Electronics	3	0	0	3	3
	MEL251	Thermo-Fluids Lab	0	0	2	2	1
	MET252	Non-Traditional Machining and Automation Lab	0	0	2	2	1
	Total		**18**	**5**	**4**	**27**	**25**
5th	MET301	Heat Transfer	3	1	0	4	4
	MET302	Design of Machine Elements	3	1	0	4	4
	MET303	Mechanical Vibrations	3	1	0	4	4
	MET304	Industrial Engineering - I	3	1	0	4	4
	MET305	IC Engines	3	1	0	4	4
		Microprocessors in Automation	3	0	0	3	3
	MEL310	Heat Transfer Lab	0	0	2	2	1
	MEL311	Mechanisms and Vibrations Lab	0	0	2	2	1
	Total		**18**	**5**	**4**	**27**	**25**
6th	MET351	Production Engineering	3	1	0	4	4
	MET352	Mathematical Methods	3	0	0	3	3
	MET353	Control Systems	3	1	0	4	4
	MET354	Fluid Mechanics - II	3	1	0	4	4
	MET3XX	Elective – I	3	1	0	4	4
	MEL361	Applied Thermodynamics Lab	0	0	2	2	1
	MEL362	Industrial Engineering – I Lab	0	0	2	2	1
	MES363	Seminar	0	0	4	4	2
	MEI364	Industrial Training	-	-	-	-	2
	Total		**15**	**4**	**8**	**27**	**25**
7th	MET401	Mechatronics and Measurement	3	1	0	4	4

		Systems					
	MET402	Industrial Engineering - II	**3**	**1**	**0**	**4**	**4**
	MET403	Machine Design	**3**	**1**	**0**	**4**	**4**
	MET4XX	Elective-II	**3**	**1**	**0**	**4**	**4**
	MET4XX	Elective-III	**3**	**1**	**0**	**4**	**4**
	MEL411	Mechatronics and Measurement Systems Lab	**0**	**0**	**2**	**2**	**1**
	MEL412	Industrial Engineering – II Lab	**0**	**0**	**2**	**2**	**1**
	MEP413	Major Project – Stage I	**0**	**0**	**6**	**-**	**3**
	Total		**15**	**5**	**10**	**24**	**25**
8th	MEL451	Operations Research	**3**	**1**	**0**	**4**	**4**
	MEL4XX	Elective-IV	**3**	**1**	**0**	**4**	**4**
	MEL4XX	Elective-V	**3**	**1**	**0**	**4**	**4**
	MEL4XX	Elective-VI	**3**	**1**	**0**	**4**	**4**
	MEP463	Major Project – Stage II	**0**	**0**	**18**	**-**	**9**
	Total		**12**	**4**	**18**	**16**	**25**

2.1.3 State the components of the curriculum **(5/5)**

Course component	Curriculum content (% of total number of credits of the program)	Total number of contact hours/week	Total number of credits
Basic sciences	13.12	34	29
Engineering sciences	16.74	40	37
Humanities and social sciences	3.61	8	8
Program core	55.65	135	123
Program electives	2.71	6	6
Project(s)	5.88	26	13
Internships/ seminars	2.26	6	5
Total number of credits			221

Table B.2.1.3 Components of the curriculum

Course Component	Curriculum content (% of total number of credits of the program)	Total number of contact hours/week	Total number of credits
Basic sciences	12	26	24
Engineering sciences	14	36	28
Humanities and social sciences	3	6	6

Program core	51	113	102
Program electives	12	24	24
Project(s)	6	-	12
Internships/ seminars	2	4	4
Total number of credits			200

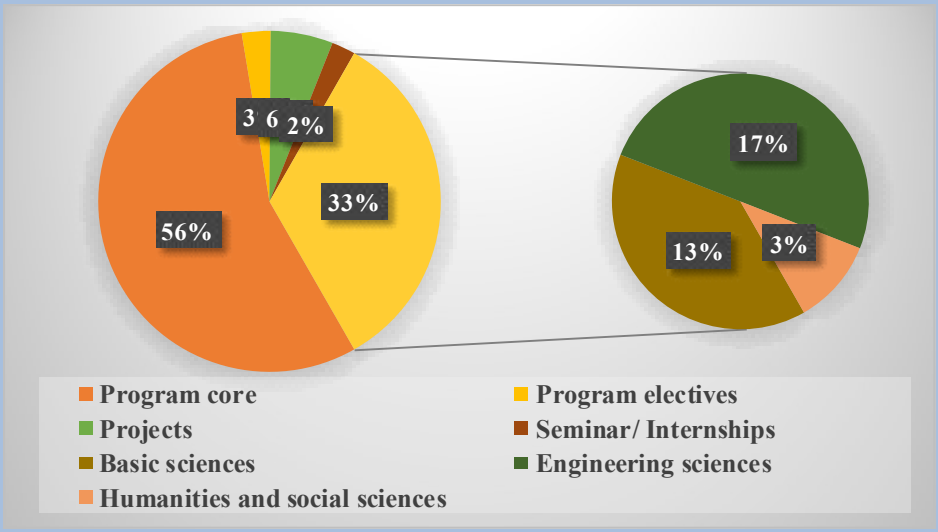


Fig. 2.2 Components of the curriculum (Graphical Form)

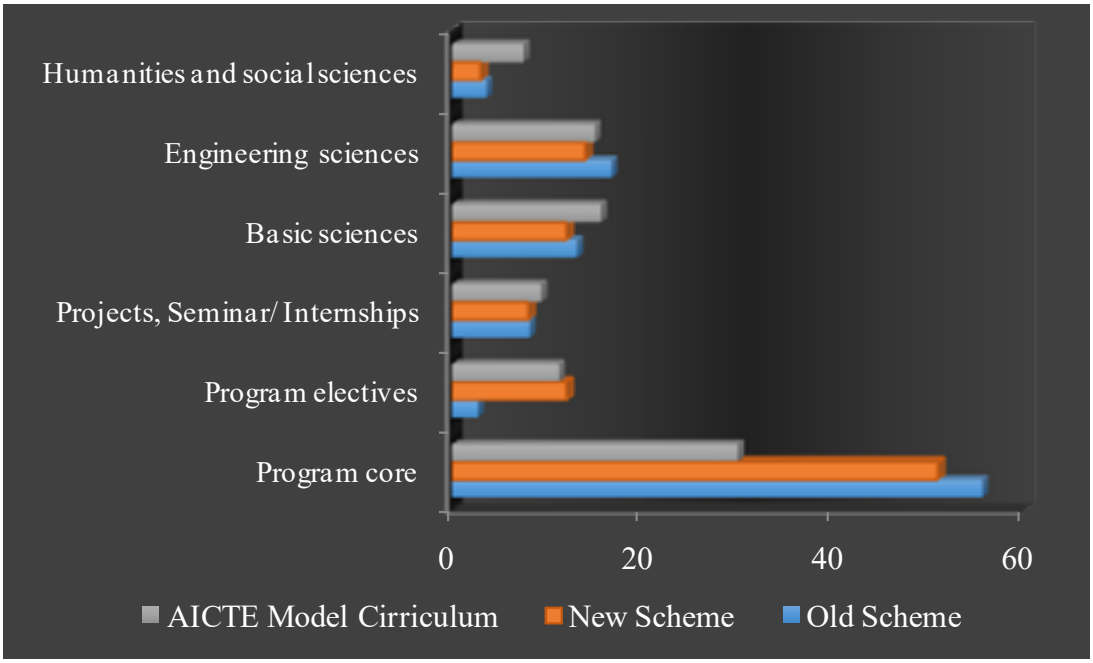


Fig. 2.3 Curriculum comparison of AICTE with NIT Srinagar

2.1.4 State the process used to identify the extent of compliance of the curriculum for attaining the program outcomes and program-specific outcomes. (9/10)

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 department has developed the course curriculum of the Mechanical Engineering Department. The individual subject teacher is responsible for the formation of course outcomes of a teaching subject. For mapping with POs/PSOs, the correlation levels are defined as 1 (Satisfactory/low), 2 (Good/Medium) and 3(Excellent/High). The Department has formed the Departmental Undergraduate Committee (DUGC) which is headed by the Head of the Department consists of senior faculty members, industrial persons, and current students. The committee discusses the curriculum, the concept of outcome-based education, program outcomes (PO's), course delivery, evaluation process, mapping etc. for achieving excellence in the teaching-learning process from time to time as required. This process has helped us to comply with the board curriculum for attaining the program outcomes. Accordingly, the course outcomes and its mapping are reviewed.

2.1.4.1 Process used to identify the extent of compliance of curriculum for attaining the PO's and PSO's

There is a well-defined and documented process in place to quantify the attainment of POs and PSOs through the curriculum. To ensure the attainment of the POs and PSOs, various direct and indirect assessment methods are followed. The Program Outcomes are achieved through a curriculum that offers several mandatory courses as well as elective courses. Each course has defined Course Outcomes that are mapped to the Program Outcomes based on their mutual correlation. The process of measuring the attainment of POs through COs is demonstrated and adequately documented the details of which are given in criteria 3.

Table 2.1.4: Compliance of Curriculum for attaining the PO's and PSO's

S. No	Course Content	Curriculum Content (% of total number of credits of the program)	Total no. of Credits	PO's
1	Basic Sciences	13.12	34	PO1, PO2, PO3,PO4,PO7,P10
2	Engineering Sciences	16.74	40	PO1, PO2, PO3,PO4,PO5,PO7,P10, P12, PSO1

3	Humanities and Social Science	3.61	8	PO6,PO7,P08,P09,P11,P12, PSO3
4	Program Core	55.65	135	P01,P02,P03,P04,P05,P06,P07,P08,P09,P10,P11,P12, PSO1, PSO2, PSO3
5	Program Electives	2.71	6	P01,P02,P03,P04,P05,P06,P07,P08,P09,P10,P11,P12, PSO, PSO2, PSO3
6	Project(s)	5.88	26	P01,P02,P03,P04,P05,P06,P07,P08,P09,P10,P11,P12, PSO1, PSO2, PSO3
7	Internships/Seminars	2.26	6	PO7,P08,P09,P10,P11,P12, PSO1, PSO2, PSO3

CO Attainment (Autumn 2017-Spring 2019)

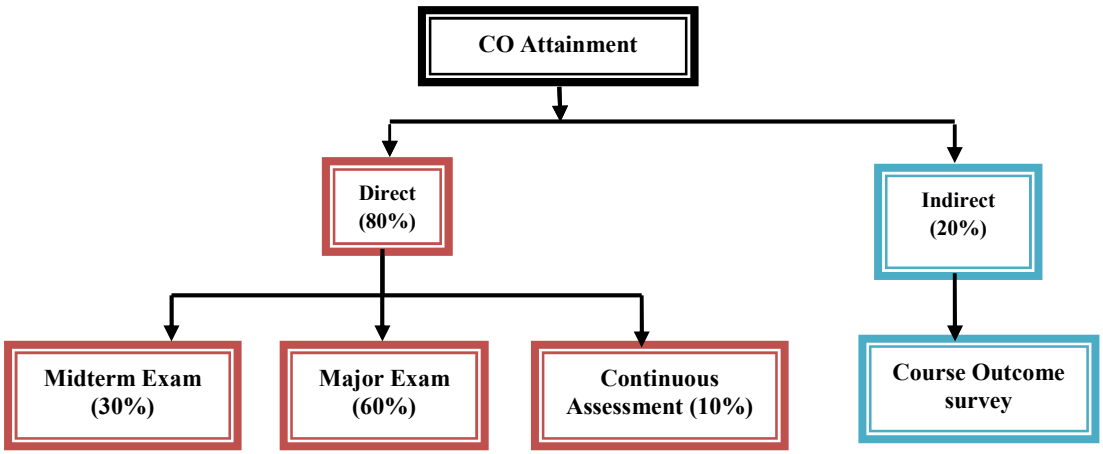


Fig. 2.4 **Course Outcome attainment levels for all Theory courses**

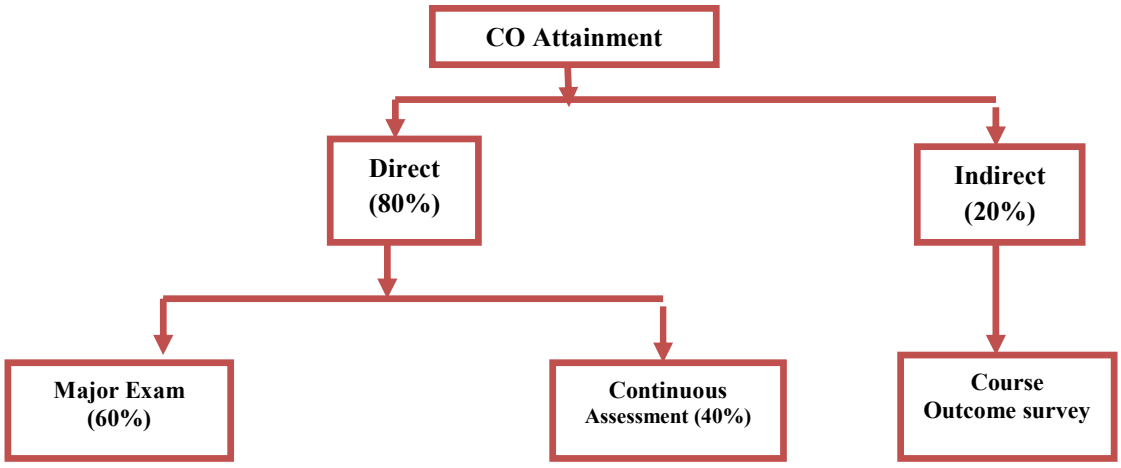


Fig. 2.5 **Course Outcome attainment levels for all Labs**

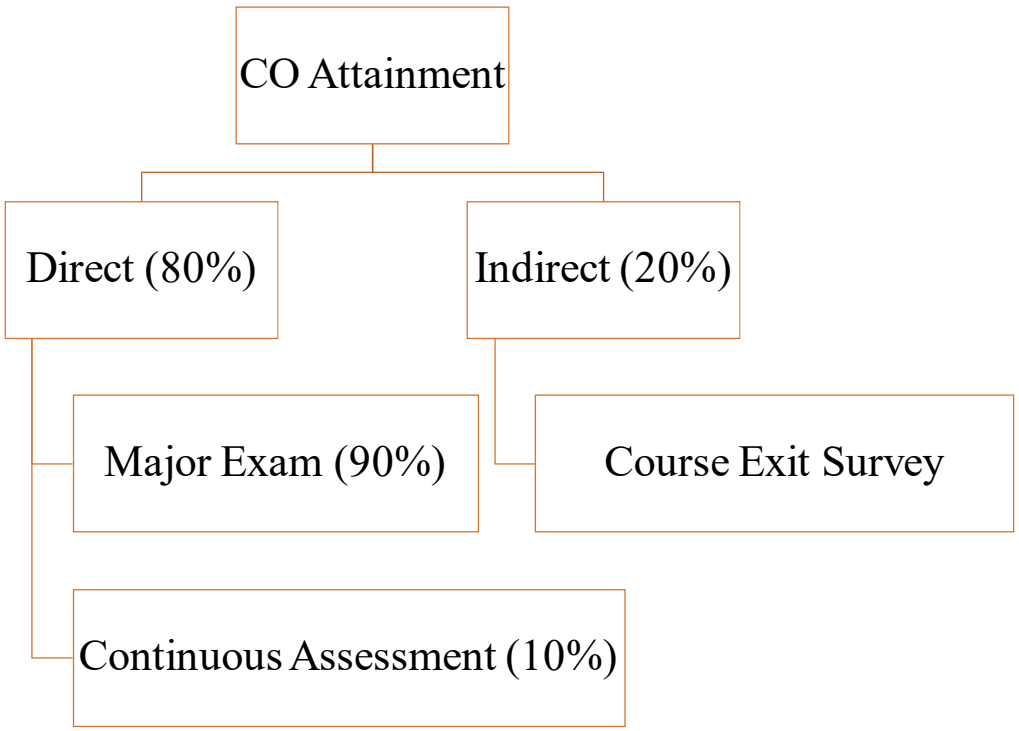


Fig. 2.6 **Course Outcome attainment levels for all Theory courses**

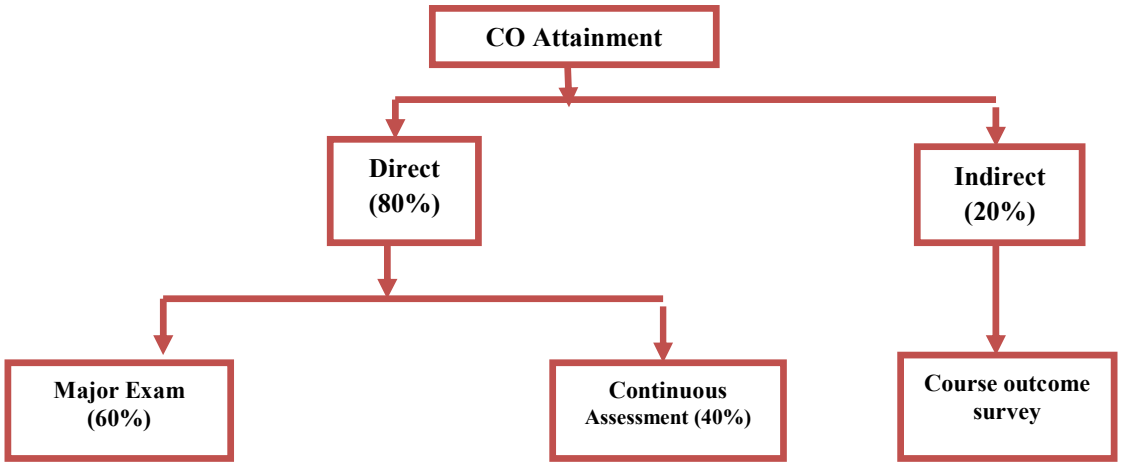


Fig. 2.7 **Course Outcome attainment levels for all Labs**

CO Attainment (Spring 2020)

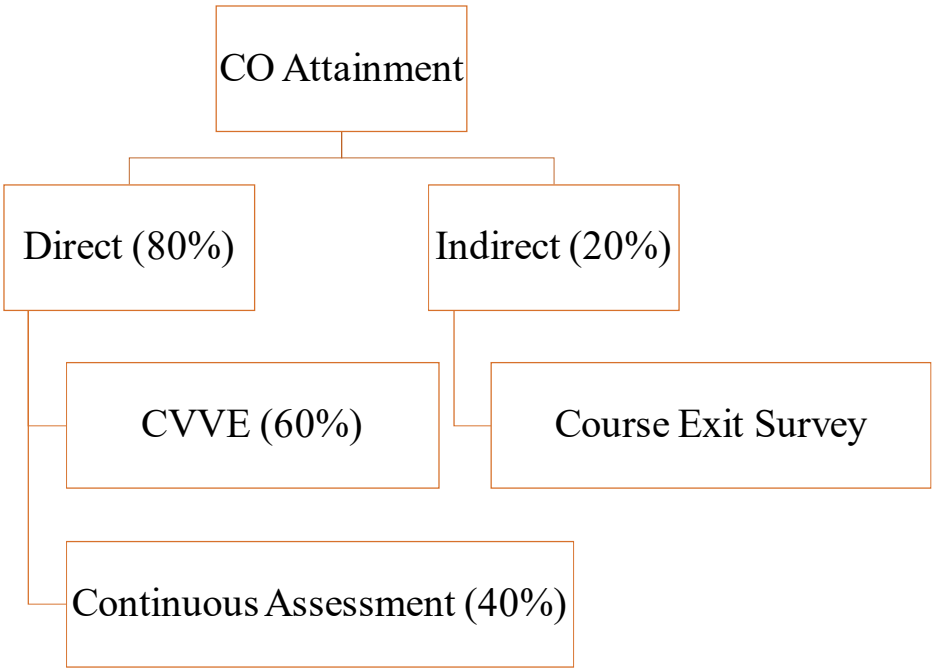


Fig. 2.8 **Course Outcome attainment levels for all Theory courses**

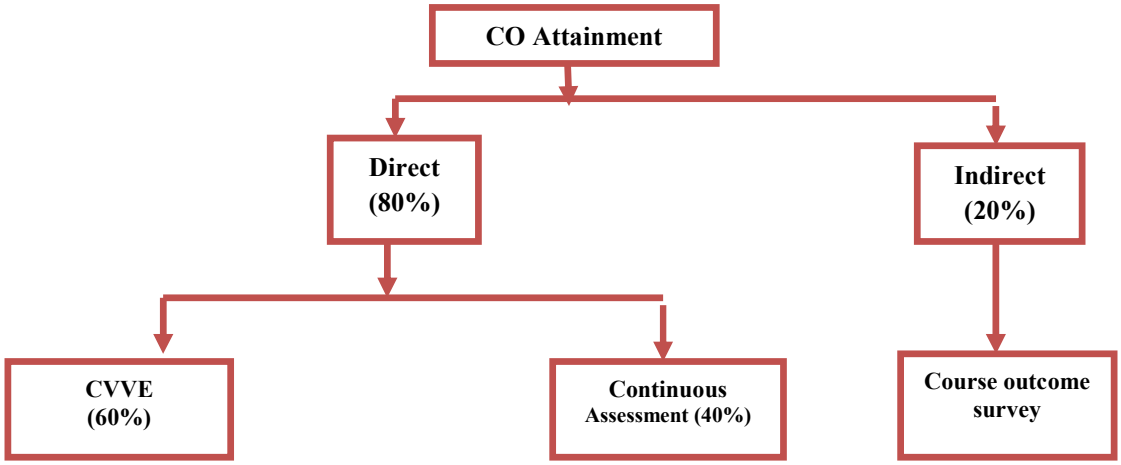


Fig. 2.9 **Course Outcome attainment levels for all Labs**

PO/PSO attainment

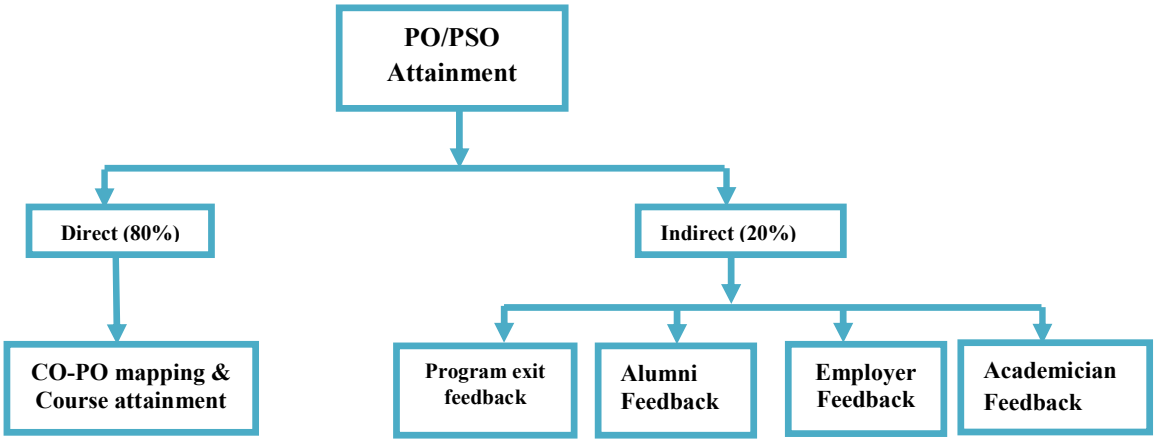


Fig. 2.10 POs/PSOs Attainment

Direct Course Outcome attainment levels (For Autumn 2017 & Spring 2018)

Assessment Method	Level	Attainment Levels
Midterm Examination	1	50% of students scoring more than & equal to 40% marks
	2	60% of students scoring more than & equal to 40% marks
	3	75% of students scoring more than & equal to 40% marks
Major Examination	1	50% of students scoring more than & equal to 40% marks
	2	60% of students scoring more than & equal to 40% marks
	3	75% of students scoring more than & equal to 40% marks
Assignments or Continuous Assessment	1	50% of students scoring more than & equal to 40% marks
	2	60% of students scoring more than & equal to 40% marks
	3	75% of students scoring more than & equal to 40% marks

Direct Course Outcome attainment levels (For Autumn 2018 & Spring 2020)

Assessment Method	Level	Attainment Levels
Midterm Examination	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks
	3	70% of students scoring more than & equal to 50% marks
Major Examination	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks

	3	70% of students scoring more than & equal to 50% marks
Assignments or Continuous Assessment	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks
	3	70% of students scoring more than & equal to 50% marks

Course Outcome attainment levels for all Laboratory courses.

Direct Course Outcome attainment levels (From Autumn 2017 to Spring 2020)

Assessment Method	Level	Attainment Levels
Continuous Assessment	1	60% of students scoring more than & equal to 50% marks
	2	70% of students scoring more than & equal to 50% marks
	3	80% of students scoring more than & equal to 50% marks
In Major Examination for Quiz	1	60% of students scoring more than & equal to 50% marks
	2	70% of students scoring more than & equal to 50% marks
	3	80% of students scoring more than & equal to 50% marks

Various direct and indirect methods followed to attain the various POs and PSOs:

Direct Assessment Methods include the following:

Mid Term Examination: Mid-term examination is conducted in the mid of the semester with a weightage of 30 marks. Apart from the mid-term exams, a makeup test is also done for those students who could not appear in the mid-term due to any reason. Such students need to take prior permission from the HOD or the class coordinator. In addition to the score obtained by the student, his weightage of assignment and attendance is also included while calculation his internal sessional marks. A total of 30 marks are considered for internal examination.

External Examination: End term / major is conducted at the end of the semester with a weightage of 60 marks.

The student is evaluated based on 100 marks per subject which include 60 marks of external examination and 30 marks of mid-term and 10 marks of the assignment.

Project Evaluation: To fulfill the PO11 and meet PSO2, where the students can work as an individual/ team member with positive attitude and ethics to apply all the engineering knowledge they have gained till 6th semester, they have to work on projects in their 7th& 8thsemester. The students work on these projects under the mentorship of the teachers in their respective domains. To ensure the quality assessment of the projects, internal progress reports

are submitted by the students and after that, a formal presentation in front of the examiners and at the end of the semester is done.

To further strengthen the above said PO and PSO, the students undergo 1½ months of industrial training/internship after the 5th semester.

• **Seminars**: To inculcate in them the soft skills and to overall improve their confidence to speak in front of the broad audience where they are made to present in front of the whole class, seminars are conducted. Also, they are made to perform on the latest techniques and technologies of the relevant discipline. They are evaluated based on the presentation, thorough knowledge of the topic and their command to answer the questions posed by the audience.

Indirect Assessment Methods include:

- **Feedback from Campus Recruiters:** Number of companies are visiting the campus for the recruitment and training of the final year students. They have also been providing the assessment of the students and the measures which can be taken to improve the quality. Feedbacks are received from the students of the program periodically.
- Feedbacks are received from the industry and academic experts.
- Feedbacks are received from the alumni working in industries.
- Feedbacks are received from the Parents of the students about the program periodically.

Attainment of program outcomes and Programme specific outcomes

Program outcomes give the goals and directions of the program. The curriculum, pedagogy, and assessment support the attainment of these outcomes to make the program outcome-based. Curriculum mapping is a tool for checking the extent to which this is achieved. The course outcome statements can judge the area to which the program outcome is being addressed in a course. The curriculum map is presented in criteria 3 where the faculty teaching a particular course will need to associate their course outcomes with the programme outcomes.

Analysis of Curriculum Map to Identify Gaps in the Curriculum

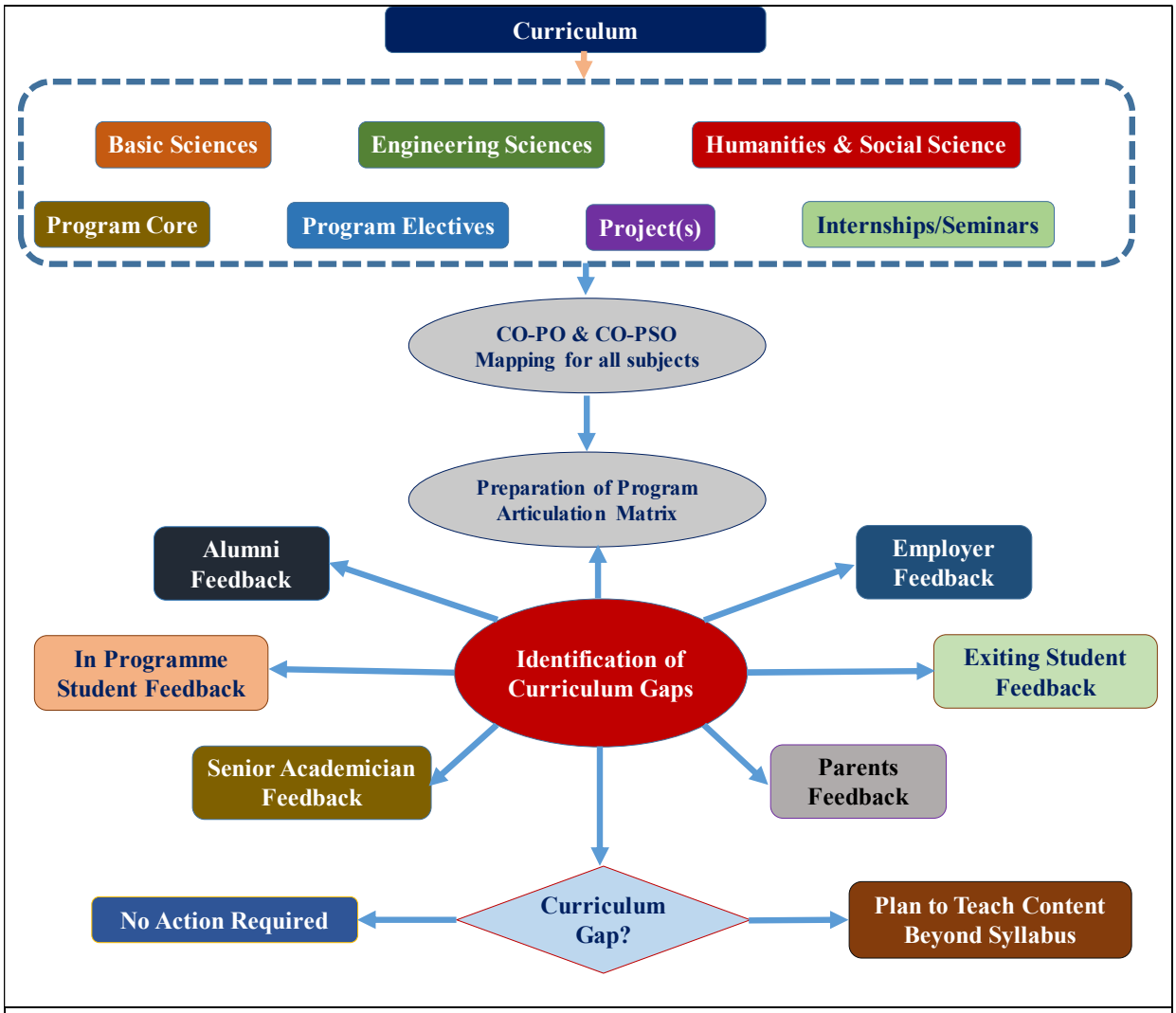


Fig. 2.11 Process to identify gaps in the curriculum

Classifying the Gaps in the Curriculum

The gaps in the curriculum, identified through surveys, fall in three categories:

- **Topic gaps**
- **Depth gaps**
- **Knowledge gaps**

Topic Gap: If a topic is determined to be necessary, but does not exist in the current curriculum, that topic is identified as a topic gap.

Depth Gap: Due to rapidly changing technology, the courses become out of date, and the material missing is related to courses that already exist in the curriculum. If courses in the current curriculum state that the desired topic is addressed, but the knowledge in the area is

not appropriate, then the issue is a depth gap. The depth gap exists due to the lack of modernization of course content or in-depth coverage of essential topics.

Knowledge Gap: If courses in the current curriculum address the desired topic, but students cannot take the courses due to the inflexibility in program constraints, then that topic is identified as a knowledge gap.

- Expert Lectures
- Workshops
- Group Assignments
- Group Discussion
- Demonstration of practical cases
- Quiz, Videos, PPTs
- Seminar, Tutorials
- Mini Projects
- Industry Internships

Further, the following survey is used to identify the gap in the curriculum

1. **Alumni Survey:** Itis done once in a year. The template is given as Annexure-I
    - 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.
2. **Industry/Employers Survey** Template given as Annexure-II
    - 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
3. **In Program Students Survey** Template given as Annexure-III
    - Measures the degree to which current students believe they are achieving
    - Program-level learning outcomes.
    - Overall satisfaction with the program.
    - Overall satisfaction with the program delivery.

4. **Exiting Students Survey** Template given as Annexure-IV
    - Measures the quality of the program and satisfaction with the curriculum.
    - An overall program delivery.
    - Collected annually
5. **Senior Academicians/Faculty Survey** Template given as Annexure-V
    - It provides general information on the quality of the program.
    - Comparison with the syllabi of premier institutes.
    - Strategic directions for the program.
    - Satisfaction with the curriculum.
    - Collected as required

2.2 Teaching-Learning Process

2.2.1 Process followed to improve the quality of Teaching Learning (15/15)

Our concern here is specifically with teaching, as opposed to academic or research program structure and administration. The 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.

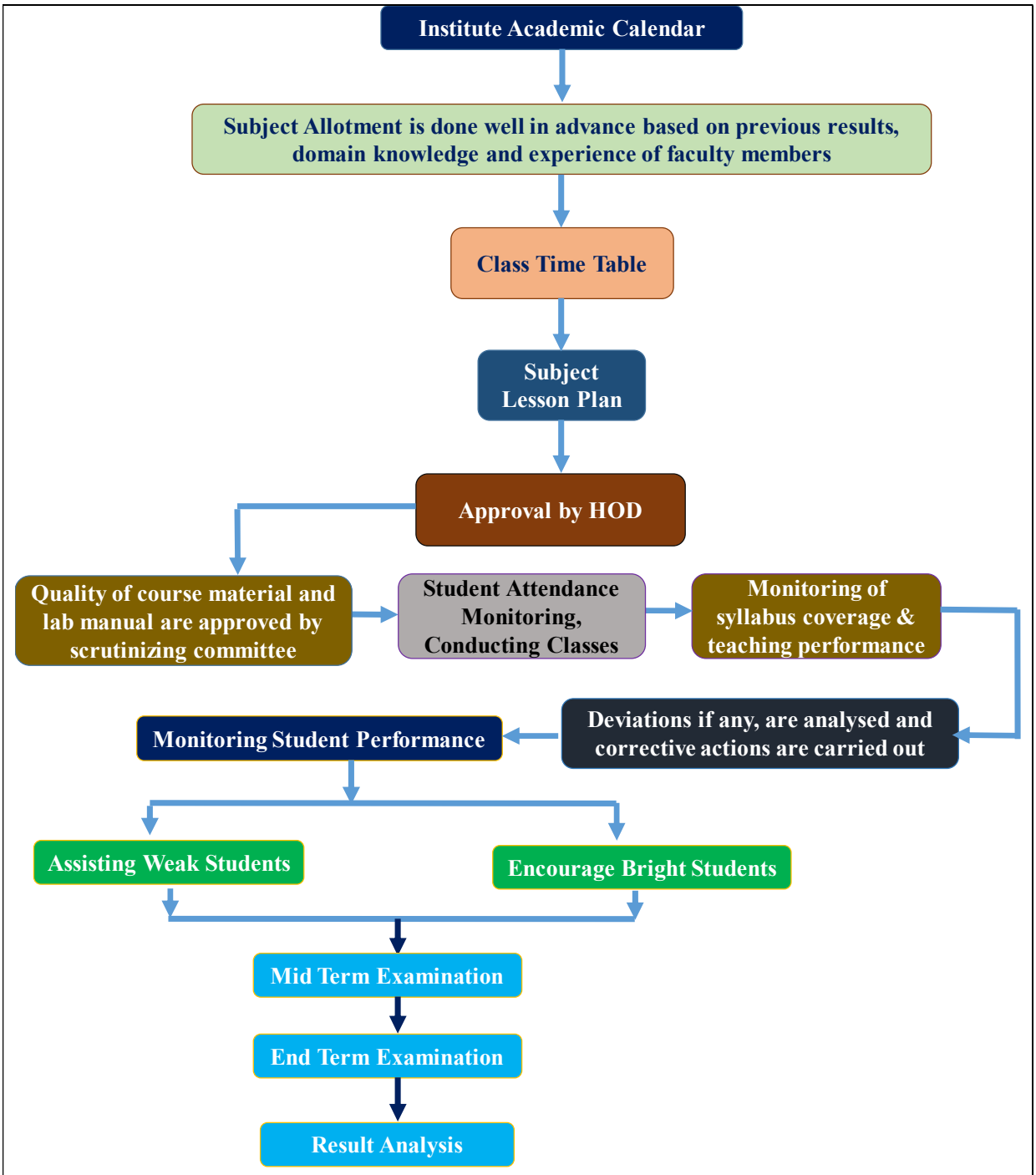


Fig. 2.12 Teaching-Learning Process

A. Adherence to the academic calendar

Our institute prepares academic calendar, which includes the commencement of the classes, internal assessment exam dates, Industrial visit, Guest Lectures, Last Working day, Lab Internal Exams, Commencement of Exams, and so on. In addition to events proposed by the institute in the academic calendar, the department has introduced many other activities that

are useful in the overall development of the students. For example, training and placement skill development program, guest lectures, industrial visit and assignment dates.

Printed academic calendar and schedule are given to each student at the beginning of the academic year and semester, respectively. The academic schedule is also displayed on the notice boards within the institute (hostel, activity centre, mess, departmental notice board etc.) and college website. The staff members and students adhere to the calendar of events to meet the department's planned activities. The academic schedule of the Institute for the academic year 2017- 2020 is appended in Annexure VI.

B. Pedagogical Initiatives

Pedagogies play an essential role in the delivery of the course content and it varies with the audience. Course allocation is made based on the choice/ expertise of the faculty members at least one month before the commencement of the semester. Once the courses are allocated, the faculty members prepare a detailed course plan, assignments, questions, quiz questions etc. for a particular course. Course handouts and materials are made keeping in mind the lesson plan and course outcomes. Faculty members use various pedagogical methods for the active teaching-learning process. A well-defined process for course allotment and load distribution is adopted at the department level. Fig. 2.9 shows various pedagogical initiatives to achieve the outcomes of teaching.

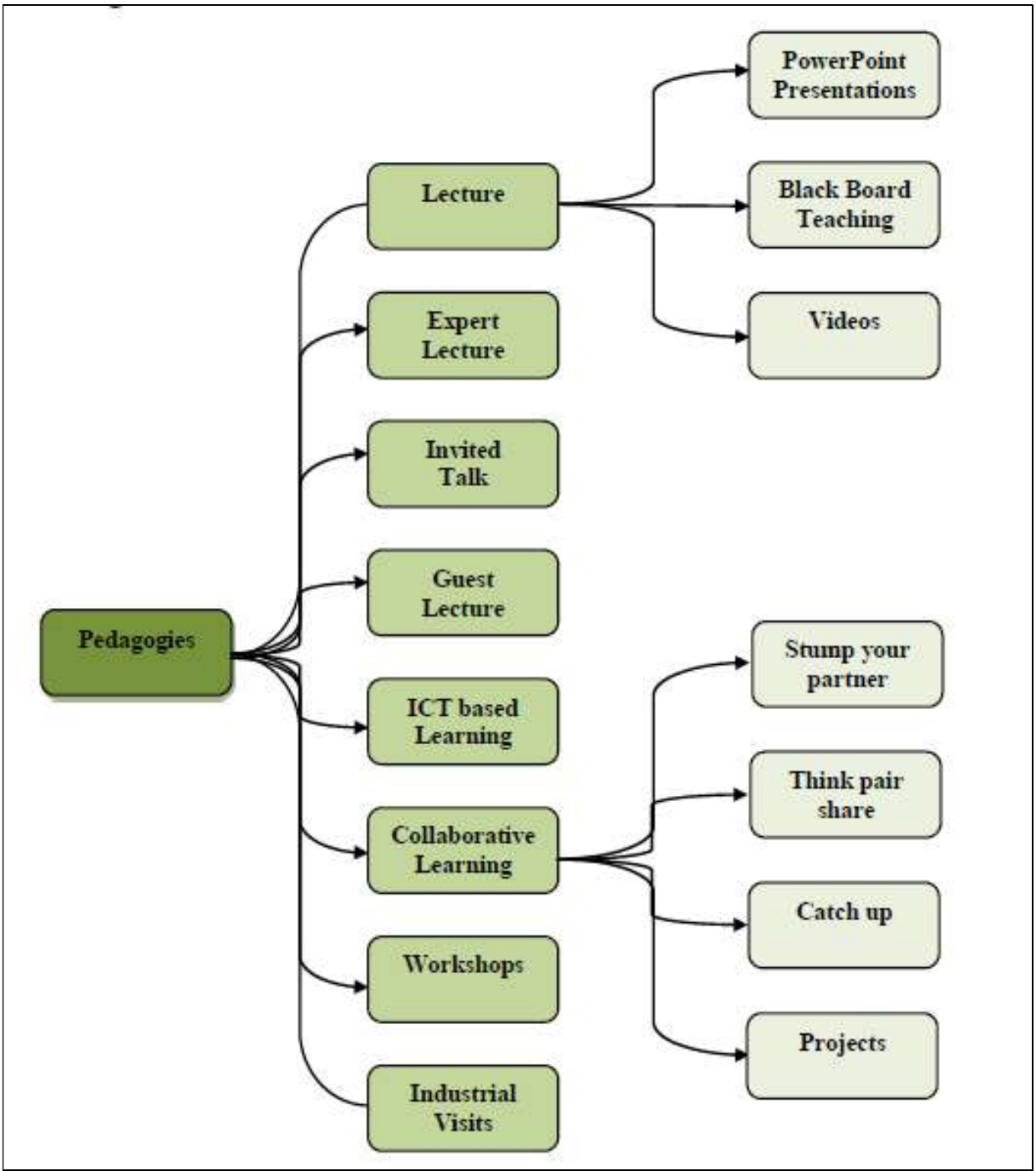


Fig. 2.13 Various Pedagogical Initiatives

B.1 Lesson plan:

Lesson plans are prepared for each lecture in the teaching plan by the faculty before the commencement of the semester, and it is duly approved after careful examination by the head of the department and made available to the students. The lesson plan encompasses the learning outcomes and the assessment of outcomes. The lesson plan

for each course is designed by the course coordinators adhering to the calendar of events of the department. The sample lesson plan for power plant engineering is given herewith.

Unit	Module	Lesson Plan (Lecture Plan)	Lecture no.	Text Book	Reference Book	Remarks (with Date)
1	**Introduction**	Energy source for Generation of electric power	1	T1	R1	
		Types of power plants, Principle, their special features	2	T2	R1	
		Applications, Major power plants in India	3	T2	R1	
	Steam Power Plant	Selection of site, general layout of power plant	4	T2	R1	
		Special features of the modern steam boilers,	5	T2	R1	
		circulation principle, steam separation and purification,	6	T2	R1	
		Economizer, and Air pre-heater (types and estimation of performance),	7	T2	R1	
		Super heater and superheat control, Feed water heater,	8	T2	R1	
		Cooling tower, temperature and pressure control	9	T2	R1	
	Hydroelectric Plant	Introduction and types, Combination with steam plant.	10	T1	R2	
		Runoff river plant in combination with steam plant.	11	T1	R2	
		Storage plant in combination with steam and nuclear plant.	12	T1	R2	
		Coordination of hydro electric and gas turbine stations.	13	T2	R1	
		Coordination of different types of power plants.	14	T2	R1	
2	**Nuclear Power plants**	Nuclear fuel, nuclear energy by fission, main components of nuclear reactors,	15	T2	R1	
		Pressurized water, boiling	16	T2	R1	

		water, liquid metal and gas nuclear reactors.				
	Diesel Power Plants	Plant layout, Two and Four stroke Diesel engines,	**17**	**T2**	**R1**	
		Fuel injectors, Lubrication and cooling system, Supercharging and starting system.	**18**	**T1**	**R2**	
	Gas and Steam Turbine combined Cycles	Simple gas turbine and steam turbine cycle	**19**	**T2**	**R1**	
		Combined cycle power generation.	**20**	**T2**	**R1**	
3	**Economic Analysis of Power Plants and Tariffs**	The cost of electrical energy, selection of types of generating equipment.	**21**	**T2**	**R1**	
		Performance and operating characteristics of power plants,	**22**	**T2**	**R1**	
		Load division among generators,	**23**	**T2**	**R1**	
		Tariff methods of electrical energy,	**24**	**T1**	**R2**	
		Combined operation of different power plants:	**25**	**T2**	**R1**	
		Advantages of combined working,	**26**	**T2**	**R1**	
		Load division among power stations,	**27**	**T2**	**R1**	
		Storage.	**28**	**T2**	**R1**	
	Beyond the Syllabus	Combustion system, Draft, Ash handling system	**29**	**T2**	**R1**	
		Operation and maintenance of steam power plant	**30**	**T1**	**R2**	
		Heat balance and efficiency	**31**	**T1**	**R2**	
		Pollution due to power generation	**32**	**T1**	**R2**	
		Working of Obra Power plant	**33**			
		Working of NTPC Dadri	**34**			
		Case study of NTPC Uchahar	**35**			
	Revision	**Steam Power Plant**	**36**	**T2**	**R1**	

		Hydroelectric Plant	**37**	**T2**	**R1**	
		Nuclear Power plants	**38**	**T2**	**R1**	
		Diesel Power Plants	**39**	**T2**	**R1**	
		Tariff methods of electrical energy	**40**	**T2**	**R1**	

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.
- 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.

Interactive classrooms

Classes are made more interactive by encouraging student participation as follows:

- Asking students to elaborate on 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.

Slide Presentation

A 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.

Video Lectures

Video lectures are imparted that are archived and can be accessed anytime anywhere. For specific 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 to facilitate this initiative. The teachers recommend NPTEL lectures for different topics, which can be accessed by the students in the hostels and the institute computer centre.

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.
- The faculty may assign each group tasks and the respective group leader provides a report on the activity.
- An assessment of 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.
- The faculty encourages each group to disseminate the knowledge they have gathered to others.

Group Discussion

Group Discussions are an excellent strategy for enhancing student motivation, fostering, intellectual agility and encouraging democratic habits. It creates opportunities for students to practice and to sharpen many 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.

Assignments

The purpose of writing an assignment is to help each student develop research and communication skills, so they obtain the necessary information and literary 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 mechanical engineering department strictly follows this method

- A minimum of one assignment is given for each course in a semester.
- The assignment given could be theoretical or practical.
- The assignments are designed so that the COs, POs, and PSOs are covered in the questions asked in the assignments.

Conducting Quiz

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

Tutorials

Tutorials are generally intended to

- Enables the students to pursue their 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 like a professional in their discipline.
- Develop students' necessary academic skills like identification and evaluation of relevant resources, effective communication, effective time-management etc.
- For each subject, at least one hour every week is allotted for conducting tutorials, as shown under the heading "Structure of Curriculum" above.
- A tutorial register is maintained for each subject and regularly maintained by the concerned faculty.

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 an internet facility.
- A computer lab equipped with 30 computers having the necessary system and application software is functioning 12 hours per day for students to carry out their work.
- A Wi-Fi facility of 10Mbps speed is available, which can be accessed anywhere on the campus.
- A Central Library (Library and Information Resources Centre) with an excellent collection of Books, Journals, Technical magazines, Newspapers in the form of hard and soft form and non-book materials in engineering and technology, science, humanities, and management like CD-ROM's are available.
- The digital library provides IP enabled access to a large number of full texts online journal databases from the various publishers such as Science direct etc.

Lectures/ Seminars

- Every year many 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.

Internal Assessment Tests

- One internal assessment tests are conducted in every semester.
- The duration of each test is one hour.
- The results of each test are analyzed to identify weak and bright students.
- The bright students are assigned some tasks 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.

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 to expose the students to the responsibility of an engineer and the engineering profession to develop the students' communication skills that include daily interaction within the working environment and technical writing.

- The students of the mechanical engineering department are deputed to renowned industries for undergoing industrial training of a minimum of 6 weeks, at 5th and 6th-semester levels.
- The same is evaluated at the end of the 7th semester.
- Also, the students have several industrial visits depending upon faculty members.

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 encouraging bright students:

- The students scored above 80% marks belong to the group of bright students.
- The respective faculty will decide the measures taken to encourage bright students.
- The measures taken include the following, and additional actions may be added according to the requirement:
- Recommend some quality references.
- Provide details of books to be referred.
- Suggest e-resources and journals.
- Introduce a new tool/ software.
- Bright students are asked to help weak students to boost their morale.
- Prepare a quiz on topics from the subject.

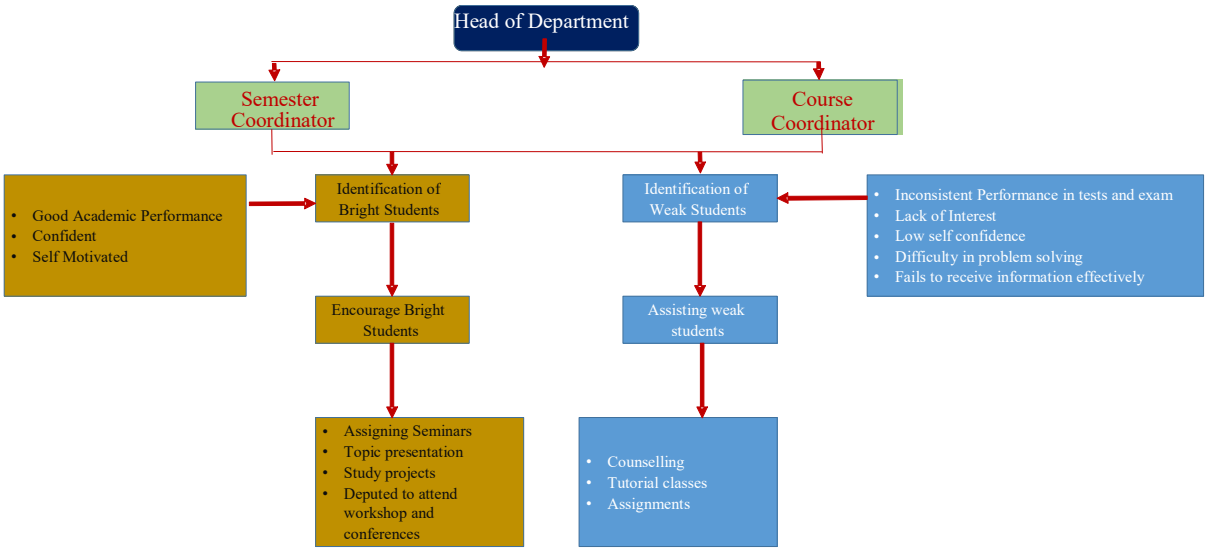


Fig 2.14 **Methodologies to support weak students and encouraging bright students**

Assistance to weak students

Theory Subjects

- One internal assessment test/ midterm test is conducted each semester to assess the student's performance in theory subjects.
- After each test, the faculty analyses the results and categorize the students into two groups.
- The students who scored less than 50% marks belong to a group of weak students and above 80% belong to the group of bright students.
- Remedial classes are conducted for the weak students by each faculty.
- The number of hours taken for remedial classes is decided by the faculty as required.
- A remedial test is conducted for the weaker students after that and the results are analyzed to identify the impact of the remedial classes.
- The respective faculty take additional measures in cases where the students fail to achieve the objective of remedial classes.

The process to identify weak students in Lab

- Based on the marks awarded for daily classwork, weak students are identified during the conduct of lab work.
- A remedial class is given to the weak students in which they are made to do the experiments again, and calculations are explained to them.
- Their performance is re-evaluated based on marks awarded for lab records.

- The same procedure is repeated at the end of the second half of the experiments.
- The respective faculty take additional measures in cases where the students fail to achieve the objective of remedial lab classes.
- The final exam is conducted at the end of the semester, and the same is repeated.

D. Quality of classroom teaching (Observation in a class)

To facilitate better classroom teaching the faculty members to arrange the students in a classroom is such a way that the faculty member is constantly monitoring the weaker students. It is always ensured that a weaker student is seated with a bright student. The classification of weaker and bright students is based on the grades in the previous semesters and the mutual consultation of the faculty members. There is constant interaction between the students and the faculty in a class. The faculty members encourage the students to interrupt the teacher during the lecture for asking questions. The relevance and the depth of the question help the faculty to assess the quality of the students and also the interest of the students in acquiring the knowledge. It consists of

- Faculty member interrupts during the lecture and asks questions regarding the topics which the faculty was discussed previously in the classroom. This ensures that the students remain attentive during the delivery of the lecture.
- The weaker students are frequently asked to repeat what the faculty are teaching in that particular class so that the students continuously maintain the rough notebook in the classroom.
- The faculty member would make at least two rounds in the classroom so that the students in the classroom record the lectures.
- Numerical problems in the classroom are assigned to the students, group-wise. Each group is monitored so that a healthy atmosphere of discussion among the students is initiated to solve the problems.

E. Conduct of experiments and continuous assessment in the laboratory

Conduct of Laboratory Experiments

The laboratories are equipped with the necessary infrastructure to facilitate effective conduction of the experiments in the laboratory. For the laboratory sessions, students are asked to bring the lab manual, observation book and record book. Students are advised to study the theory behind the experiment and the procedure to experiment with the lab session.

Students conduct the experiments and record the observations in the observation book. After completion of the experiment, students are encouraged to discuss the learning from the test.

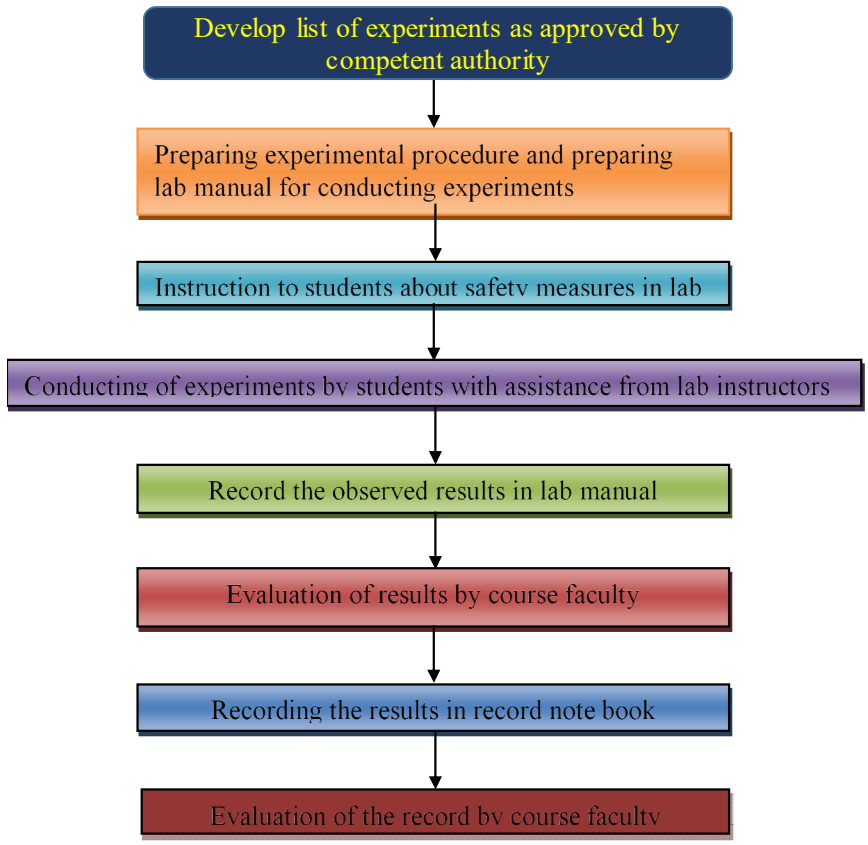


Fig.2.15 **Process flow of Conducting Experiments in Laboratory**

F. Continuous Assessment in the Laboratory

- Ongoing evaluation is done by the faculty in every lab session for 20 marks based on rubrics as shown in Table 2.2.1. The average marks of all sessions will be considered forwarding the final internal assessment.
- Figure 2.11 shows the process for the conduction of an internal lab examination and finalizing the targets. Table 2.2.2 lists the rubrics for assessment in Internal Lab Examination.

Table 2.2.1Rubrics used for continuous evaluation in every lab session

Parameters	Allocated Marks	High	Medium	Low
Experiment	**5**	Experiment executed with output	The experiment was partially completed in the lab session	The experiment was not executed in the lab session
		5 Marks	**3 Marks**	**0 Marks**
Viva Voce	**5**	Student answered all the viva voce	Student Answered only few viva voce questions	Student did not answer any viva voce question

		questions		
		5 Marks	**3 Marks**	**0 Marks**
Record writing	**10**	The completed record was submitted	The record was provided but incomplete	The record was not presented in the lab session
		8–10 Marks	**4 - 6 Marks**	**0 Mark**

Table 2.2.2 Rubrics used for Evaluation of Internal Lab Examination

Parameters	Allocated Marks	High	Medium	Low
Write up	**6**	The student was able to design and draw the diagram with the expected output is written correctly.	The student was able to Draw the diagram but does not design/partially known.	The student was unable to draw a diagram.
		3-6 Marks	**1-2 Marks**	**0 Mark**
Execution	**6**	The student was able to conduct the given experiment with output.	Student was partially able to conduct the given experiment.	The student was not able to conduct a given experiment.
		3-6 Marks	**1-2 Marks**	**0 Mark**
Viva Voce	**8**	The student answered all the questions.	Student answered only few questions	The student did not answer any question
		5-8 Marks	**2-4 Marks**	**0 Mark**

- A lab manual is maintained in each laboratory.
- Each laboratory includes experiments in the prescribed syllabus.
- All the experiments in the prescribed syllabus are compulsorily followed and completed by the end of the semester.
- Students should complete at least two or three experiments that cover the advanced topics in each laboratory.
- The faculty could assign open-ended Experiments or the students may choose an experiment on their own to be completed in the laboratory.
- The objective and the procedure for all experiments in the prescribed syllabus and is available in the lab manual.
- The solution, along with the objective and the procedure is added to the lab manual for the experiments that cover advanced topics.
- Groups comprising a maximum of five to six students are formed in each class.
- One from the group is designated as the group leader.

- The faculty may assign each group tasks and the respective group leader provides a report on the activity.
- Every student maintains a rough record to record the details of the 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 checks the procedure, and then students can proceed with experimenting.
- To facilitate the continuous monitoring of the experiments performed by the student, Ph.D. scholars are always associated with the concerned faculty member.
- A Ph.D. scholar supervises each group of the students. The Ph.D. scholars initially assess the students who are finalized with the consultation of the faculty member.
- The student should record the observations in the rough record while experimenting.
- Students may also analyze the data to plot graphs or other related work.
- The faculty-in-charge verifies the final output.
- Students should add the details of the experiments done in the laboratory to the prescribed record book.
- Students can appear for the Practical Examination only if the faculty-in-charge certifies the record.

G. Students feedback of teaching-learning process and action taken

Student's feedback

- It is valuable for identifying areas for instructional improvement.
- The HOD provides suggestions for improvement based on the feedback of the students wherever needed.

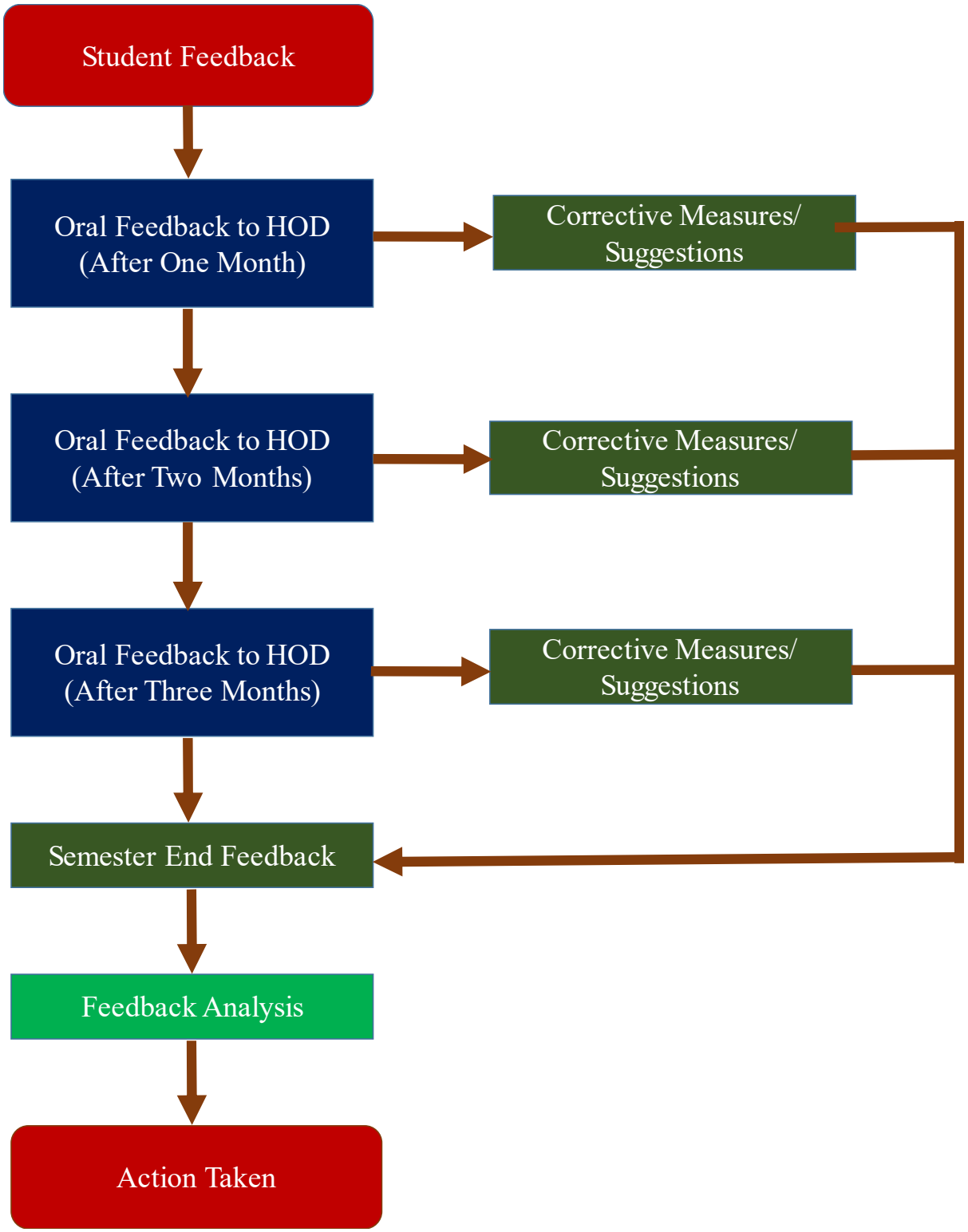


Fig. 2.16 Flow Chart of Students feedback of teaching learning process

Feedback analysis

The feedback forms are collected and are submitted to the HOD for perusal. Depending upon the feedback, the HOD communicates the feedback to the respective faculty member to know their strengths and deficiencies to enhance their teaching skills. The HOD gives necessary

suggestions, guidance, and advice for the areas where improvement is needed. The feedback remains strictly confidential between the HOD and the concerned faculty member so that the morale of the faculty does not get affected. The sample feedback form is given below:

DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
REPORT OF COURSE APPRAISAL/FEEDBACK, SPRING 2019

Faculty Name	Course Title with Code
Dr. H. S. Pali	**Power Plant Engineering (MEC 804)**

Dear Faculty,
We have consolidated the students feedback for the Spring 2019 and find below the feedback received on the subject taught by you. We have advise you to discuss your ratings with HOD for further improvement.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Average Score
Overall Rating	4.7	4.3	4.5	4.5	4.6	4.4	4.6	4.3	4.4	4.4	4.4	4.4	4.5	4.5	4.5	4.3	4.5	4.5	4.46
Earlier Rating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	PARAMETERS
1	Objectives of course plan clearly specified
2	Course coverage and depth
3	Topics provide any new knowledge
4	Availablility of prescribed study material
5	Clarity of lectures and presentation in terms of the fundamental concepts
6	Audibility and articulation of the instructors oral presentation
7	Encouragement by the instructor to think logically and objectively
8	Instructor's response to the questions asked in the class
9	Instructor's attitude towards teaching of this course.
10	Regularity of classes on time
11	Overall quality of teaching
12	Ability to maintain discipline in the class
13	Accessebility of teacher in his office during office hours
14	Reflection of course plan in the examinations
15	Level and length of examinations
16	Evaluation of answer script
17	Transperancy in grading
18	Improvement in the understanding of course after midterm and feedback

SCALE USED	
1	Poor
2	Fair
3	Good
4	Very Good
5	Excellent

Faculty Signature **Action Taken:**_____

_____

HOD Signature _____

2.2.2 Quality of end semester examination, internal semester question papers, assignments and evaluation (15/15)

A. Process for Internal Semester Question Paper setting and evaluation and effective process implementation

To ensure the quality of the internal semester question papers, the following process is adopted

- Regular midterm exams are held in adherence to the academic calendar of the institute.
- The question papers are set in such a way that the COs maps with the questions asked.

- The question papers are examined and verified by the HOD to ensure the standard of the question paper and ensures that the COs of the course are covered. The questions papers are modified if HOD is not satisfied with the 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.
- The respective faculty prepare the scheme of evaluation and solution to the problems in the question papers in advance.
- The faculty record the CO coverage and the marks allotted.
- The evaluated answer books are returned to the students by the faculty after evaluation in the midterm exam. It is the statutory requirement of the institute to show the estimated answer books to the students. The faculty receive student's feedback 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 to the controller of examinations only after the students are satisfied with the evaluation.
- The students are required to append "Seen" or "satisfied" on the evaluated answer books so that no student is left without seeing his evaluated answer books.

NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech. 8th Semester (Major) Examination, Spring-2019

Theory of Elasticity (MEC ~ 803)

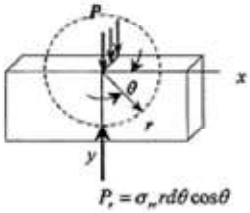
[Total No. of Questions: 5] [Total No. of Printed Pages: 1]

Max. Marks: 60 **Max. Time Allowed: 3 hour**

Note:

- *Attempt any four (4) questions.*
- *Assume any missing data suitably.*

Q.1 (a)	What are the assumptions made in theory of elasticity? Explain how stress is a tensor quantity.	2+3	CO1
(b)	Explain the Airy's stress function. Derive bi-harmonic equation in Cartesian coordinates for 2D stress states.	2+3	CO2
(c)	Explain the significance of compatibility equation, derive the same for a strain field.	2+3	CO2
Q.2 (a)	Derive the solution of two dimensional problems by the use of polynomials.	8	CO2
(b)	Find graphically the principal strains and their directions for rosette measurements $\varepsilon_\varphi = 2\times10^{-3}$ $\varepsilon_{\alpha+\varphi} = 1.35\times10^{-3}$ $\varepsilon_{\alpha+\beta+\varphi} = 0.95\times10^{-3}$ inch per inch where $\alpha = \beta = \varphi = 45°$	7	CO1
Q.3 (a)	Explain how the following principle are used to solve the problems of theory of elasticity in practice: i. Generalized Hooke's Law ii. Saint Venant Principle iii. Fourier Series Solution	2+3 +3	CO1 CO2
(b)	A large plate is subjected to a line of uniform distribution of load acting on the edge as indicated. Determine the Airy's stresses in polar coordinates.	7	CO4

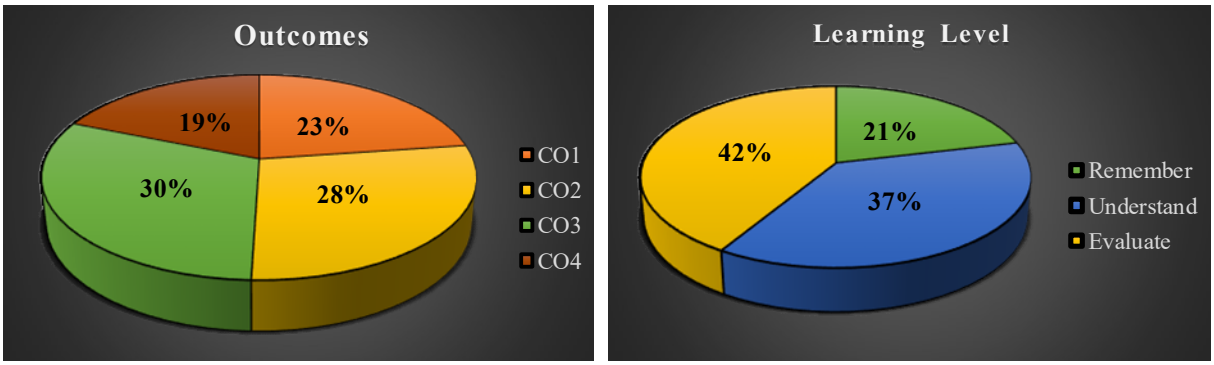


Boundary Conditions

$\sigma_\theta = \tau_{r\theta} = 0$ @ $\theta = 0, \pi$

$P_r = \sigma_r r d\theta \cos\theta$

Q.4 (a)	Derive Winkler-Bach formula for curved beams.	7	
(b)	Investigate what problem of plane stress is satisfied by the stress function $$\varphi = \frac{3F}{4d}\left[xy - \frac{xy^3}{3d^2}\right] + \frac{p}{2}y^2$$ applied to the region included in y = 0, y = d, $x = 0$ on the side x positive.	8	CO3
Q.5 (a)	Show that the following stress function satisfies the boundary condition in a beam of rectangular cross-section of width $2h$ and depth d under a total shear force W. $$\phi = -\left[\frac{W}{2hd^3}xy^2(3d - 2y)\right]$$	8	CO3
(b)	Derive expressions for radial and tangential stresses for a plate with a circular hole and subjected to uniform tensile stress S in x-direction.	7	CO4



(a) (b)

Fig. 2.17 Coverage of course outcomes (a) and Bloom's Learning Level (b)

B. The 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 question papers, 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.).

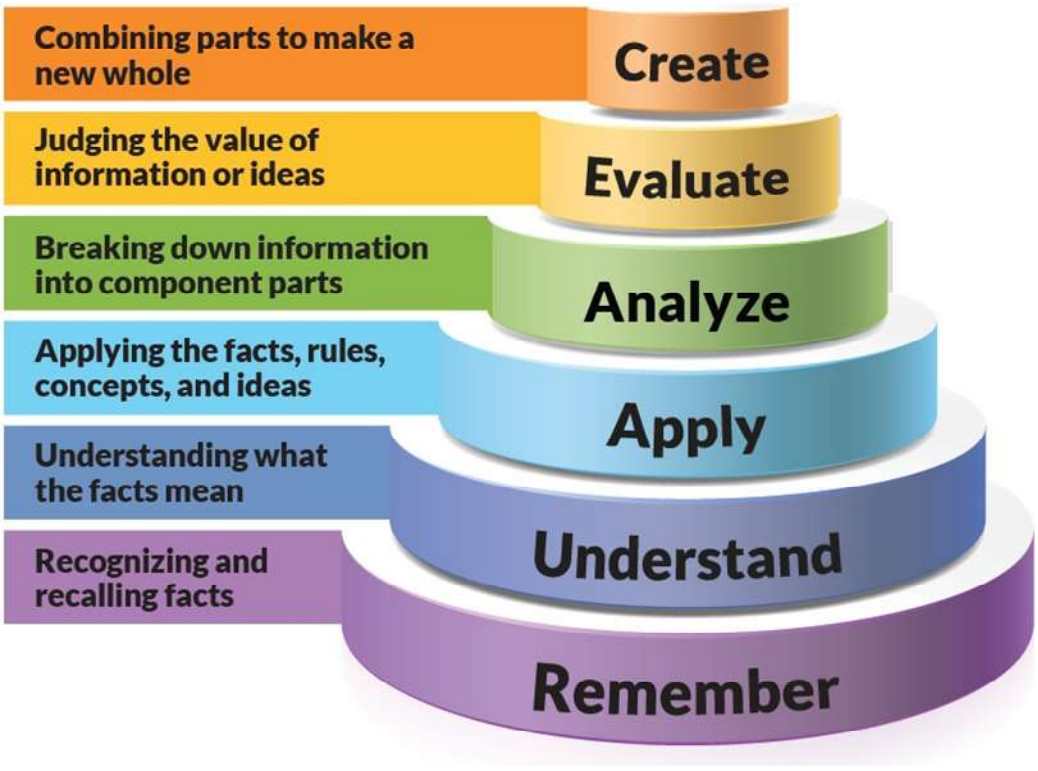


Fig. 2.18 Bloom's Taxonomy for active learning

The questions asked are of three categories:

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

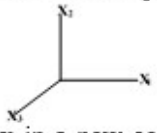
C. Evidence of COs coverage in-Class Test/Mid-Term Tests

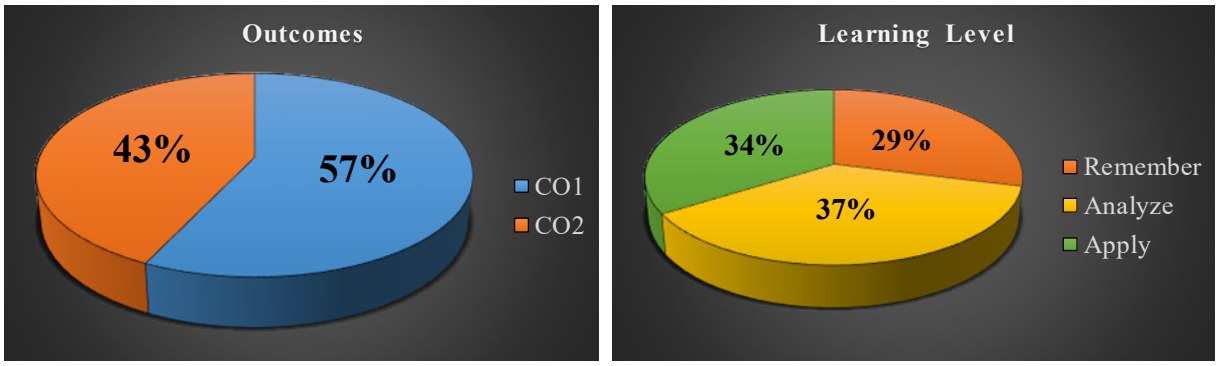
- All class tests and mid-term test papers cover all topics relevant to COs.
- A record of all class tests / mid-term tests/end semester test is maintained and submitted to the HOD for his perusal to ensure that all the topics are covered in these exams.
- HOD/faculty members ensure that the questions asked previously (midterm) are not repeated so that significant portions of COs are covered.
- All the faculty members are compulsorily required to maintain a question paper file (soft and hard copy) where all the question papers are saved so that question paper for end term is set without repeating any question from the midterm. This scheme helps to prevent the repetition of questions and coverage of maximum COs.

NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR
DEPARTMENT OF MECHANICAL ENGINEERING
B.Tech. (Eight Semester)
Mid-Term Examination – April 2019
Theory of Elasticity (MEC ~ 803)

[Total No. of Questions: 3] [Total No. of Printed Pages: 1]
Max. Marks: 30 **Duration: 1 ½ hour**

All questions are compulsory

Q.1 (a)	Differentiate between Plane Stress and Plane Strain Problems.	**3**	
(b)	The Component of a first and second order tensor in a particular coordinate frame are given by $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 4 \\ 0 & 4 & -3 \end{bmatrix}$ $\begin{bmatrix} 2 \\ 5 \\ 4 \end{bmatrix}$  Determine the component of the vector and matrix in a new coordinate system found through a 45° ($\pi/4$) rotation about the x_2 axis. Choose a counterclockwise rotation when viewing down the negative x_2 axis.	**7**	**C01**
Q.2 (a)	Define surface and body forces. Derive the equation of equilibrium in three dimensions.	**1+2**	**C02**
(b)	By means of strain rosette, the following strains were recorded during the test on a structural member $\varepsilon_0 = -13\times10^{-6}$, $\varepsilon_{45} = 75\times10^{-6}$, $\varepsilon_{90} = 13\times10^{-6}$ Determine the magnitude of the principal stresses if elastic modulus, E = 200GN/m^2 and Poisson ratio, μ= 0.3	**7**	**C01**
Q.3 (a)	State whether the following are airy's stress function or not (i) $\phi = Ax^2 + By^2$ (ii) $\phi = Ax^3$ (iii) $\phi = A(x^4 - 3x^2y^2)$	**3**	**C02**
(b)	Given the stress function, $\varphi = (H/\pi)y\tan^{-1}(x/y)$. Determine whether stress function ϕ is admissible. If so determine the stresses.	**4+3**	



(a) (b)

Fig. 2.19 Coverage of course outcomes (a) and Bloom's Learning Level (b)

D. Quality of assignments and its relevance to COs

- The respective faculty members announce the assignment issue and submission dates.
- A minimum of two assignments are given for each subject.

To ensure the quality of the assignments following procedure is adopted

- The assignments are designed to map the COs of the course.
- The assignments are designed to cover both the theoretical and numerical portion of the course.
- The questions given are categorized into knowledge, comprehension, application, analysis, evaluation and synthesis levels.
- To ensure maximum exposure in the subject, it is a departmental practice that a minimum of 5 different questions is asked for each assignment.
- Faculty can choose the type of assignment to be given (questions/ open book test/ seminars or presentations*)*
- In the evaluation of the assignment, the required feedback corresponding to each answer is provided by the faculty, so that the student can understand the mistake.
- The faculty, after submission of every assignment, explains the solution of the questions in the class, which enables the students to perform well in the final examination.
- For any genuine reason, if a student is unable to perform well in the given internal assessment tests or assignments, and improvement test is given to him/her.
- If a student remains absent for all the tests conducted, they are marked as “Absent” in the result.
- Assignments are used as a tool for practice, and evaluation is based purely on internal assessment.
- The marks scored by each student are recorded separately for each Course Outcome.
- The CO attainment level is calculated after each test and assignment.
- The CO attainment falls into three levels.

NATIONAL INSTITUTE OF TECHNOLOGY, SRINAGAR

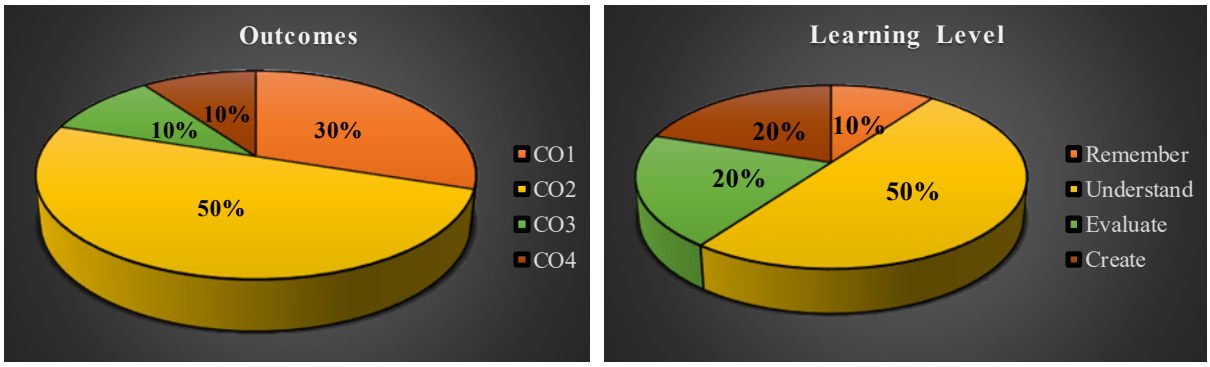
DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech. 8th Semester

Theory of Elasticity (MEC ~ 803)

Max. Marks: 20 **Deadline for submission: 05/04/2019**

Q.1	Derive expressions for compatibility for two dimensional problems.	**CO2**
Q.2	Derive expressions for strain at a point in terms of stress components.	**CO1**
Q.3	Explain Saint-Venant's principle.	**CO2**
Q.4	What is the value of the theoretical stress concentration factor, Kt for the following situations:	**CO4**
(i)	A circular hole in an infinite plate subjected to uniaxial tensile loading	
(ii)	A circular hole at the center of a rotating disk.	
Q.5	Explain the procedure for the determination of stresses on any plane inclined to a regular set of axes. Direction cosines define the inclination of the plane.	**CO1**
Q.6	Explain how about Fourier series can be applied for the two-dimensional problem under gravity loading.	**CO2**
Q.7	Discuss various applications of polar coordinates and the advantages of considering the problem using polar coordinates.	**CO2**
Q.8	Explain with an example Solution of torsional problems by energy method.	**CO3**
Q.9	Explain the concept and assumptions involved in the theory of elasticity?	**CO1**
Q.10	Discuss the Principle of superposition. Derive the expression for Equations of equilibrium in three dimensions?	**CO2**



(a) (b)

Fig. 2.20 Coverage of course outcomes (a) and Bloom's Learning Level (b)

2.2.3 Quality of the student's projects **(19/20)**

A. Process for identification of students projects

The projects are divided into 4 major groups depending on the availability of the specialization of the faculty:

- Design Engineering
- Thermal Engineering
- Production Engineering
- Industrial Engineering

A.1 Identification of project and allocation methodology to faculty members

Project Identification and Faculty Members allocation

- The Head of Department /PC provides the list of faculty members and their area of specialization to the students at least one month before the end of the 6th semester. The Head of Department/PC also identifies the industry professionals/alumni for guiding the students.
- The project coordinator advises the students to form a group of 4-5 members, and identify the project area/title, obtain the consent of faculty/industry professionals to guide them. The Project coordinator collects these details from the students at least two weeks before the end of the 6th semester. The group of students includes students from weak, average and bright student categories.
- The Head of Department/PC/project coordinator finalizes project titles, project guides, groups of students and displays the allocation at least one week before the end of the 6th semester.
- The Head of the Department/PC/project coordinator allocates laboratory resources for in-house projects and assigns the number of days per week for working on the projects in the industry (if the project is being carried out in industry).
- The Head of Department/PC/project coordinator lists the types of projects based on Environment, Safety, Ethics, Cost and category of the project i.e. whether it is application-based, Product Development based or Research-based projects.

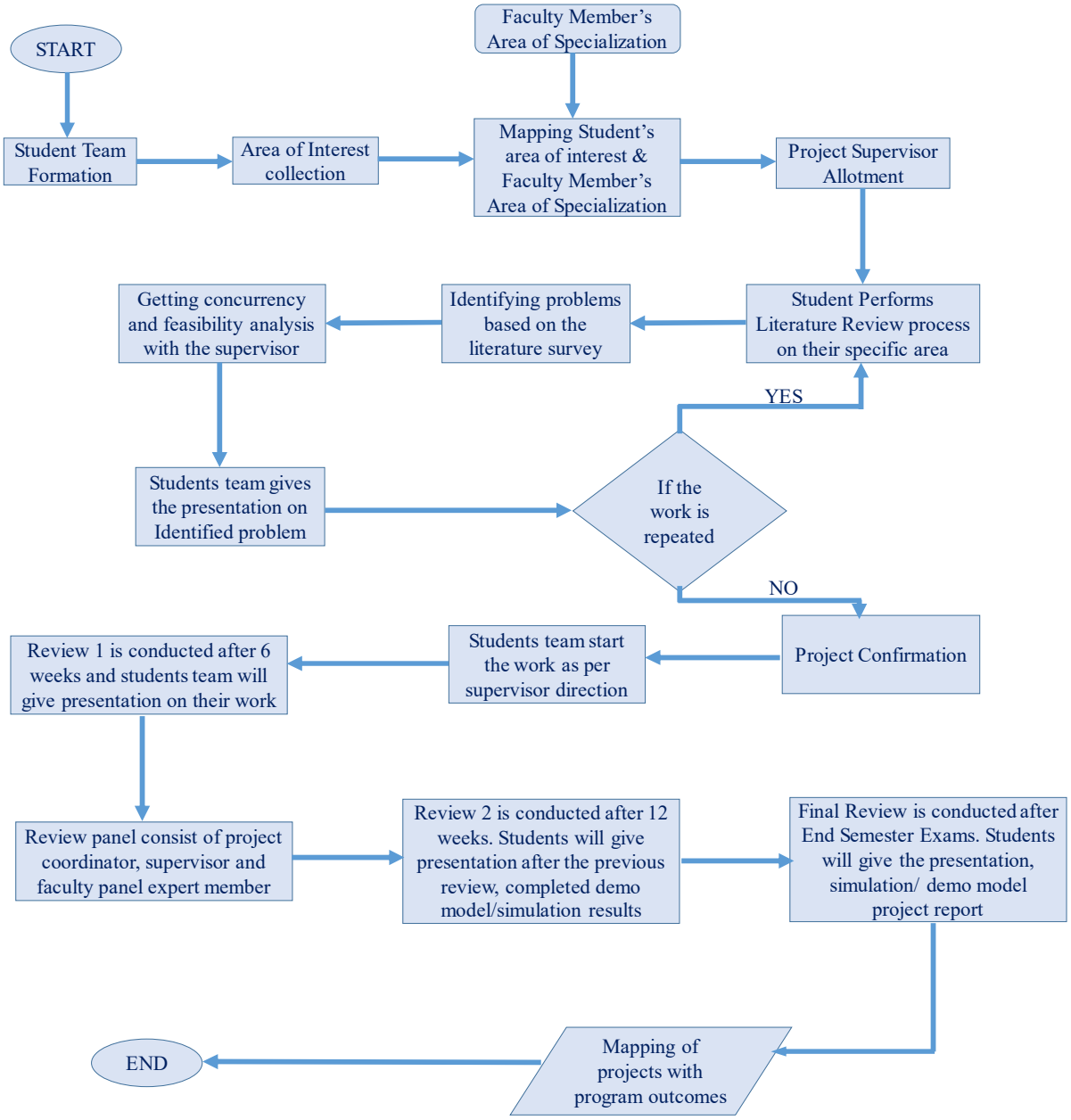


Fig. 2.21 Process used to assess individual and performance of the project

A.2 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 recorded included the details of their interactions with the project supervisor.

The 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.

B. Type and relevance of the projects and their contribution towards of POs and PSOs

Project areas	Mapping with POs	Mapping with PSOs
Design	**1-12**	**1, 2 & 3**
Thermal	**1-12**	**1, 2 & 3**
Production	**1-12**	**1, 2 & 3**
Industrial	**1-12**	**1, 2 & 3**
Software	**1-12**	**1, 2 & 3**
Relevance to the POs and PSOs		

YEAR 2017-18

S.No	Name of Students	Year	Project	Supervisor
1	YOGESH BHARTI HARIT GUPTA TARUN MAHAJAN VIPUL SHARMA	2017/18	STAIR-CLIMBING WHEEL CHAIR WITH OBSTACLE DETECTION SYSTEM	PROF. (DR.) G. A. HARMAIN
2	RUSSEL KHAJURIA VIR SINGH DEEPAK KUMAR GOURAV KUMAR	2017/18	DESIGN AND FABRICATION OF SMART SOLAR TUBE	PROF.(DR.) M. HANIEF

3	VIKASH KUMAR VERMA AGRAJ AGARWAL	2017/18	ELECTRICITY GENERATION BY PEDAL POWER	DR. M.S. CHAROO
4	KARAN SINGH KRISHAN LAL NAMONARAYAN MEENA	2017/18	BLOCKAGE CLEANING MACHINE	DR. M.S. CHAROO
5	DEVIK BHARDWAJ SURAJ SHUKLA KULDEEP SINGH RATHORE RAHUL PELWAR	2017/18	DESIGN OF AGRICULTURAL SPRAYING AND WEEDING MACHINE	PROF. SAAD PARVEZ
6	SATYAM SIDHANT DUBEY SAMPADA ANGRAL SHUBHAM SHARMA SHUBHAM	2017/18	FABRICATION OF WOOD LASER ENGRAVING MACHINE	DR. MOHAMMAD MURSALEEM
7	SAIKET RASHID SUNIL KUMAR RAKSHIT MISHRA CHANDAN KUMAR	2017/18	DESIGN AND FABRICATION OF A KITCHEN WASTE BASED BIOGAS PLANT	DR. M. HANIEF

8	FARMAN ULLAH UBAID JEELANI TUGOO RAHEEL BASHIR PEER ZAKIR HUSSAIN BURHAN U DEEN MIR	2017/18	WALNUT WASHING AND DE-HULLING MACHINE	PROF. SAAD PARVEZ
9	RAHUL KUMAR ABHISHEK MEHRA JAFER SADIQ AMRIT SINGH	2017/18	MAGLEV WINDMILL	PROF. M.S. CHAROO
10	VOGESH SINGH AYUSH KUMAR SATYAM SINGH SURYAVANSHI	2017/18	DESIGN OF COLLISION DETECTION AND PRECAUTION SYSTEM	DR. M. HANIEF
11	BHUVAN M NITESH SHARMA RISHAV GANDOTRA MANJYOT SINGH	2017/18	DESIGN AND FABRICATION OF STIRLING ENGINE	DR. M. HANIEF
12	SAURAV DAS MADAN MOHAN PIYUSH AVINASH GHARDE BHESHAJ KUMAR CHANDRA	2017/18	DESIGN AND FABRICATION OF RICE TRANSPLANTING MACHINE	PROF. M. HANIEF

13	ABHINANDAN SHARMA ADITYA PATHANIA RITVAJ MADOTRA SHIV SAINI	2017/18	LAKE CUM DRAIN CLEANER WITH WASTE RECOGNIZATION	PROF. (DR.) G.A. HARMAIN
14	RISHABH ANURAG SHIVENDRA SRIVASTAVA SUNNY RANJAN TARIQ MOHD.	2017/18	MECHANICALLY OPERATED WHEELCHAIR CUM STRETCHER	
15	NOMAN DANISH KAMLESH MEENA SHUBHAM KUMAR GOPAL KUMAR SHARMA	2017/18	SOLAR ENERGY DRIVEN THERMOELECTRIC AIR COOLING FOR CARS	DR. M. HANIEF
16	VISHESH KUKREJA AZEEM KHAN DEEP CHAND LEEL DHAIRYAVARDHAN SINGH RATHORE	2017/18	APPLICATION OF MATLAB FOR DESIGN OF SOME MECHANICAL COMPONENTS	PROF. G. A. HARMAIN
17	AHMAD ALI MIR ANSAB JAN KHALAF HASSAN AQIB SHOWKAT	2017/18	ELECTRIC BIKE DRIVE SYSTEM	PROF. (DR.) ADNAN QAYOOM

18	MANISH UPMANYU	2017/18	STEFAN-BOLTZMANN LAW: REVISITING THE EXPERIMENT	PROF.(DR.) ADNAN QAYOOM
19	M ABBAS BHAT NK SUMAMAS JUGMEET SINGH	2017/18	SOLID WASTE SEGREGATION USING OBJECT RECOGNITION	PROF. M F WANI

YEAR 2018-19

S.NO.	NAME OF STUDENTS	YEAR	PROJECT	SUPERVISOR
1	RAHUL SHARMA SANJAY YADAV DEEPAK SINGH KANYAL	2018/19	AUTOMATIC SPRAY PUMP	DR. M.S. CHAROO
2	SHUBAM DOGRA MAYANK VYAS ADITYA SHARMA HARASHI KRISHN SHUKLA RITIK RAJ VERMA	2018/19	DESIGN OF PRE AND POST ACCIDENT PRECAUTION SYSTEM	DR. M. HANIEF
3	BASIT ALI RAMAN JAKHAR NIKHIL VERMA SUMIT KUMAR VIKRAMJEET SINGH	2018/19	WIRELESS MINI FORKLIFT	PROF. DR. M. HANIEF

4	BRIJRAJ MALAV SATISH MALAV DILKHUSH MEENA LOKENDRA SINGH ANIL KUMAR	2018/19	AUTOMATIC PAPER CUTTING MACHINE USING GENEVA MECHANISM	PROF. DR. M. S. CHAROO
5	SIDDHARTH KUMAR MOLUGURI VAMSHI BUDH SHARAN SUBHAM KUMAR SINGH	2018/19	DESIGN AND FABRICATION OF SOLAR UPDRAFT TOWER	PROF. DR. M. HANIEF
6	UDAY SINGH MEENA VINAYAK PUROHIT YASIR SHABIR SAIF AKHTAR	2018/19	DESIGN OF MECHANICAL COMPONENTS USING MATLAB AND SOLIDWORKS	DR. M.S. CHAROO
7	NAMAN ADHIKARI NIKHIL SHARMA MUNISH KUMAR AKSHAY SHARMA SHIVAM GUPTA	2018/19	DESIGN AND FABRICATION OF UPPER BODY EXOSUIT ARM	PROF.DR. BABAR AHMAD

8	MOHSIN AYOUB MIR BASIT ALI SHAH AADIL AHMAD RATHER WASIF NISSAR	2018/19	SOLAR TRACKER USING ARDUINO	PROF. DR. BABAR AHMAD
9	GHAFOOR UL HAQ ARSHJOT SINGH SAGAR VISHAV KARMA PARAMJEET SINGH VIVEK BHAL	2018/19	DESIGN AND DEVELOPMENT OF A TREADMILL CYCLE	PROF. DR. M.F. WANI
10	AAKROSH KALSOTRA RAHUL THAPA SAKHIL THAPPA AAKISH KUNDAL REDDI NAVEEN	2018/19	FABRICATION OF OIL FILTRATION UNIT	PROF. DR. M. HANIEF
11	PRAVEEN SINGH TOMAR NIRMAL SWAMI NITISH RAJ	2018/19	AUTOMATED BODY MASS INDEX CALCULATOR	PROF. DR. M. HANIEF
12	KULDEEP PRASHANT DWIVEDI NITIN AGARWAL NITISH KHANDELWAL	2018/19	AUTOMATED SOLAR GRASS CUTTING MACHINE	PROF. DR. M. HANIEF

13	MUZAMIL HASAN THINLAY NORBOO STANZIN CHOSDON MAYANK JAIN SAROJ KUMAR	2018/19	DESIGN AND FABRICATION OF PORTABLE APPLE GRADING MACHINE	A.P M. MURSALEEN
14	DEEPANSHU KUMAR VIVEK KUMAR AVINASH CHEVALA SHUBHAM PAWAR DHARMSINGH MEENA	2018/19	VEHICLE TO VEHICLE COMMUNICATION	PROF. G.A. HARMAIN
15	ARSHAAN NAZIR MANMEET SINGH IMTIYAZ AHMAD YOGESH KHICHI	2018/19	INVESTIGATION OF PUMP AS TURBINE FOR MICRO-HYDRO POWER GENERATION	PROF. DR. ADNAN QAYOOM
16	NARENDRA KUMAWAT YOGESH KUMAR ABHISHEK KAJLA RAHUL KUMAR	2018/19	DESIGN AND FABRICATION OF MANUAL RICE HULLER MACHINE	PROF. DR. M.S. CHAROO

2019-2020

S. No.	Name of Students	Title of the Project	Supervisor
1.	Hujat Kirmani, Rajpal Singh, Ateeb Ahmad, Manik Tripathi	Haptic Assisted Writing Kit (HAWK)	Dr. Majid H. Koul
2.	Sanjay Kumar, Krishna Kumar, Mahaveer Das, Alok Ranjan Yadav	Kinematic And Kinetostatic Analysis For A Basic Planar COBOT Task	Dr. Majid H. Koul
3.	Dheeraj Kumar, Kanav Sharma, Shubham Verma, Ayaz Mohi U Din	Design And Analysis Of Elliptical Cross-Section Nozzle	Dr. M. Hanief
4.	Souleh Sulaiman Wani, Amandeep Singh Bali, Haris Farooq, Nitish Sharma	Design Of Oil Reclamation Setup	Dr. M. Hanief
5.	Basharat Ahmed Wani, Shoaib Ul Hassain	Surface Modification Of Magnesium Alloys By Friction Stir Processing	Dr. N. Zaman Khan
6.	Mohammad Sarfaraz, Shubham Sharma Manikanteswera Reddy M. Dasari Tharun	Design And Analysis Of Composite Leaf Spring Under Static Loading	Dr. M. Mursaleen
7.	Shamas U Din, Aadil Ramzan, Aadil Fayaz	Design And Analysis Of An Automotive Single Plate Friction Clutch	Dr. M. Mursaleen
8.	Nikhil Kumar, Akshum Dogra, Mandeep Singh, Arjun Attri	ABAKAS	Dr. Manoj Kumar
9.	Raghav Khurana, Bhasker Koushal, Anurag Bhardwaj	Design And Analysis Of Disc Brake Rotor	Dr. M.S. Charoo
10.	Manzoor Hussain, Muzammil Hussain, Abhay Kumar Yadav, Anil Pal	Thermal Analysis And Optimization Of Foam Fins By Varying Pore Sizes And Number Of Fins	Dr. M.S. Charoo
11.	Vaisakh Babu	Experimental And Theoretical Evaluation of Interface Temperature During Dry Sliding of Al6063 And Mild Steel Tribopair	Prof. M.F.Wani
12.	Basit Ahmed Khan	Design And Analysis Of A Micro Electro-Mechanical System Based Solar Energy Harvester	Prof. Babar Ahmad

13.	Ashwani Kumar, Himanshu Gupta, Sumit Kashyap, Saurabh Singh	Utilization Of Waste Frying Oil As An Alternative Fuel In Single Cylinder Four Stroke Diesel Engine	Dr. H. S. Pali
14.	Ayush Mishra, Pankaj Kumar, Abhishek Kumar	Design, Modelling & Simulation Of Major Components Of Go-Kart	Dr. H. S. Pali
15.	Sangham Chourasya, Amit Kumar	Pedal Powered Washing Machine	Dr. M. Mohsin Khan
16.	Aditya Narayan, Shubham Kumar Jha, Gaurav Singh	Study Of Tribological Behaviour Of Silicon Nitride-Titanium Carbide Composite / Silicon Carbide Tribo-Pair & Aisi A2 Tool Steel	Dr. M. D. Sharma
17.	Dileep Tiwari, Sanjay Pal, Amit Verma, Vinay Bhasin	Applector –Apple Collector	Dr. M. D. Sharma

Project areas of students from 2018 to 2020

Project Areas	**BATCHES**		
	2014-2018	**2015-2019**	**2016-2020**
Design	05	08	10
Thermal/ Fluid	02	01	04
Manufacturing Process	02	02	02
Industrial	02	01	02

C. Project related to industry

- The students are encouraged to take up industry-related projects. This objective is attained by choosing a problem from the industry where the students have undergone practical training at the lower semester. During the practical training, the students encounter different problems in which they choose their final year project.

D. Process for monitoring and evaluation

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. Thus foolproof monitoring and evaluation are ensured. The departmental project evaluation committee meets twice in the 7th and 8th semester to assess the progress of the projects. The committee evaluates the projects according to the following scheme.

Criteria	Marks
% of work completed	10
Fulfilment of POs, PSOs & Cos	10
Complete Design	10
Presentation	20
Knowledge	20
Response to questions	30
Total	**100**
Project Evaluation Committee Criteria Marks Awarded	

NOTICE

As approved by the Head, Mechanical Engineering Department, the evaluation of B.Tech Final Year Projects (MEC 706) shall be conducted on 4th January 2020 (Monday), 10:30AM onwards. The following committee shall carry out the evaluation (via on-line mode):

a. Prof. Babar Ahmad (Chairman)
b. Prof. Sheikh Nazir (Head, MED) - Member
c. Dr. Mohsin Khan - Coordinator B.Tech 7th Semester - Member
d. Dr. Muhammad Mursaleen - Convener

Further, all the concerned supervisors are requested to kindly attend the evaluation of the respective student groups. The exact timings and slots for each group will be notified separately.

Enclosures:
1. List of students and the supervisors allotted.
2. Rubrics for evaluation of students performance.

Regards
Dr. Majid H Koul
Convener DUGC, ME

E. Process to assess individual and team performance

- As has been stated above, the students remain in constant touch with the supervisor. During the interaction, the supervisors enquire from the team member about the progress both at the individual and the team level. This process helps the supervisor to determine the performance of the individual and the team. The students are awarded marks during this interaction also by the supervisor so that none of the students lag behind and develop a quality to work individually and with the team. The evaluation committee divides the presentation of the project group among the students such that all the students in the

group such that each student presents his share of work and accordingly, the committee evaluates the individual and team performance.

DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Rubrics to Evaluate Performance in Minor Projects and B.Tech. Major Projects

#	Rubric	Mid Semester Review	End Semester Review	Total Marks Allocated
R1	**Project Synopsis/Proposal Evaluation** - Identification of problem domain and detailed analysis - Study of the existing systems and feasibility of project proposal - Objectives and methodology of the proposed work	15	-	15
R2	**Mid-Term Project Evaluation** Design Methodology - Planning of Project Work - Demonstration and Presentation	15	-	15
R3	**End Semester Project Evaluation** Incorporation of Suggestions - Project Demonstration (Working Model/Prototype/Simulation) - Presentation Format and Communication Skills	-	30	30
R4	**Project Report Evaluation** - Project Report Format - Description of Concepts and Technical Details - Conclusions, Discussions and Future Work	-	15	15
R5	**Evaluation by Guide** - Self-Motivation and Determination - Technical Knowledge and Awareness related to Project - Regularity	10	15	25
Total				100

F. Quality of completed projects/ working prototypes

- To ensure the quality work, 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.

Each student presents the content of work he has contributed, by PPT. The question-answer session follows the presentation. 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. During this session, the students also take feedback from committee members about the possible changes.

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 the project. A PPT presentation is given by the students one by one in the group in front of the committee. The question-answer session follows the presentation 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 the final award has arrived.

To encourage the students to take up good projects, the committee also ranks the projects based on

1) Immediate practical applications
2) Technological ethics
3) Local need
4) Environmental friendly
5) Cost-effectiveness

G. Evidences of Paper Published/Awards received by the projects

1) Ayush Mishra (Mech-90/16), Abhishek Kumar Upadhya (Mech-36/16), Pankaj Kumar (Mech-67/16) and Dr. H.S.Pali, Design of Power Train System of Go-Kart, ISFT-2020, YMCA, Faridabad.

Figure 2.22: ***Ayush Mishra (Mech-90/16) during poster presentation in ISFT-2020 YMCA, Faridabad***

2) Lubaid Nisar (2018BMEC026), Bazeela Banday, Mouminah Amatullah, Munazah Farooq, Aasif Nazir Thoker, Annayath Maqbool, Mohd Atif Wahid, An investigation on effect of process parameters on surface roughness and dimensional inaccuracy using

Grey based Taguchi method, Materials Today: Proceedings, Elsevier.

Delhi Technical Campus

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GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

ICFTMM 2020

International Conference on

Futuristic Trends In Material and Manufacturing

7th - 8th April 2021

IOP science

CERTIFICATE OF PARTICIPATION

This is to certify that Mr Lubaid Nisar has

presented paper entitled An investigation on effect of process parameters on surface roughness and dimensional inaccuracy using grey based taguchi method. in

Futuristic Trends In Materials and Manufacturing-2020, held at Delhi Technical Campus during 7th - 8th April, 2021

Convener Director

SPONSOR PARTNERS CETPA ICTACADEMY ORACLE Academy aws

Figure 2.23: Certificate of participation of *Lubaid Nisar (2018BMEC026)*

2.2.4 Initiatives related to Industry interaction (8/10)

A. Industry supported laboratories (2/2)

1. NIT Srinagar has established a Sesign Studio to assist MSMEs. Currently it is working on Developing a Design for an MSME Software technology situated in SRINAGAR.

2. Undertook an industrial Project for Khyber Milk Plant to solve their problem related to Industrial efficiency.

3. Partnered with M/s Rahim Greens to generate a Covid-19 response system and conducted Covid-19 challenge to obtain solutions to fight COVID pandemic.

4. Conducted training programs with local industries for implementation of Industrial Engineering techniques for increasing productivity and cost reduction. (Organised by MSME J&K)

Figure 2.24 Students conducting skill development programs at Rahim motor located at Industrial estate

Figure 2.25 Department conduct open innovation challenge in association with industry

N.I.T Srinagar signed MOU with

- National Innovation Foundation-India, Ahmadabad
- I.I.T Roorkee
- N.I.T Silchar
- N.I.T Durgapur
- N.I.T Jalandhar
- N.I.T Hamirpur
- Central Glass & Ceramic Research Institute (CGCRI) Kolkata
- N.I.T Surat
- National Institute of Hydrology Roorkee
- MNNIT Allahabad
- ALTTC BSNL Ghaziabad

B. Industry involvement in the program design and curriculum (1/3)

As has been stated in the process for designing the program curriculum (2.1.1), valuable feedback is sought from the employer (industry) where the students have been placed 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.

Guest lectures by various industry Experts for Partial delivery of the Courses

C. Industry involvement in partial delivery of any courses for students (3/3)

- Expert talks enrich the students and faculty members with the latest updates from the industry.
- The eminent personalities of various fields and stalwarts of the industry are invited to lend valuable information from their first-hand experience, which serves as an ideal platform for the students.
- The department organizes expert lectures on various topics and issues related to the curriculum of Engineering in which distinguished technocrats are invited to deliver their expert lecture for the academic enhancement of the students and the staff.
- There is always an endeavor to create opportunities for students to learn and interact with industry experts.

The lectures result in the lively discussion thus imparting the current state of the art knowledge to students and staff.

Year	Number of lectures delivered
2017-18	7
2018-19	5
2019-20	5
Industry involvement in course delivery	

To strengthen interaction with industries and to keep our students updated with the latest trends in Mechanical Engineering, the Department undertakes technical visits to industries to practice aspects of various course contents.

Implementation

S. No	Event	Name of the Organization	Date/ Period	Status
1.	Two Day's M-CAD Workshop	NIT, Srinagar	13th & 14th Oct 2018	**Successful**
2.	Indo-Tunisia Symposium	NIT, Srinagar	17-21 June 2019	**Successful**
3.	Short Term course on "Advanced Materials Processing and Characterization."	NIT, Srinagar	22-26, July 2019	**Successful**

D. Impact Analysis of Industry Institute Interaction and action taken (2/2)

- 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 (10/10)

A. Industry Training /Tours for students

Industrial training/tours are organized at 7th and 8th-Semester levels when the students are fully acquainted with the different streams of mechanical engineering.

B. Industrial / internship/ summer training of more than two weeks and post training assessment

It constitutes an important component of the curriculum of the department.

DETAILS OF INDUSTRIAL TRAINING ATTENDED BY STUDENTS

AY - 2017-18

S. No.	Name	Enrolment No	Name of Organisation
1	Ubaid Jeelani Tugoo	133/14	Flowmore Limited
2	Sunny Ranjan	176/14	Bharat Wagon & Engineering Corporation Limited
3	Ahmad Ali Mir	124/14	Flowmore Limited
4	Shubham	191/14	BHILAI Steel Plant
5	Suraj Shukla	179/14	ONGC
6	Amrit Singh	149/14	HIM Technofore Limited
7	Krishan Lal	188/14	SAIL BSP Plant
8	Vikas Vaishnav	158/14	Maruti Suzuki
9	Satyam Singh Suryavanshi	167/14	Uprvunl Panki Thermal Power Station
10	Khalaf Hassan	151/14	WPIL Limited
11	Aqib Showkat	155/14	DUCAT
12	Rahul Pelwar	177/14	CAD CAM EXPERTS,AGRA
13	Aditya Pathania	140/14	NHPC (Salal Power Station)
14	Rakshit Mishra	634/14	SAIL BSP Plant
15	Peer Zakir Hussain	136/14	NHPC
16	Mohd Abbass Bhat	139/14	JKSRTC Pampore
17	Manjot Singh	150/14	IISC Bangalore
18	Siyaram Meena	178/14	NPCIL
19	Noman Danish	171/14	NHEL
20	Azeem Khan	156/14	Maruti Suzuki
21	Manish Upmanya	147/14	NHPC
22	Saurav Das		IOCL
23	Deepchand Leel	187/14	Maruti Suzuki
24	Gopal Kumar Sharma	195/14	Lumax Ancillary Limited
25	Vir Singh	160/14	NHPC
26	Shivendra Srivastava	194/14	BHEL
27	Dhairya Vardhan Singh Rathode	170/14	Maruti Suzuki
28	Prinkesh Bamboo	197/14	SAIL
29	Shubham Sharma	189/14	BHILAI Steel Plant
30	Manoj Kumar Chaudary	163/14	Kalyani Technoforge Limited
31	Ansab Jan	128/14	Flowmore Limited
32	S. Jagmit Singh	198/14	Mechanical Division, Baramulla
33	Siddhant Dubey	134/14	NHPC
34	Yogesh Bharti	130/14	NHPC
35	Rahil Bashir	132/14	VIZAG Steel

36	Tariq Ahmad	173/14	NHPC
37	Sanpada Angral	135/14	NHPC
38	Burhan-ud-deen Mir	137/14	VIZAG Steel
39	Chandan Kumar	131/14	HIM Technofore Limited
40	Shiv Saini	142/14	HIM Technofore Limited
41	Namonarayan Meena	199/14	NPCIL
42	Ridveg Madotra	141/14	NHPC
43	Vipul Sharma	182/14	NHPC
44	Rishav Gandotra	146/14	NHPC
45	Harit Gupta	138/14	NHPC
46	Nitesh Sharma	159/14	NHPC
47	Kamlesh Meena	174/14	RAPS
48	Vheshaj Kumar Chandra	166/14	COAL India
49	Farman-ullah	127/14	VIZAG Steel
50	Tarun Mahajan	165/14	NHPC
51	Bhuvan M	168/14	Kothari Groups (BFW)
52	Shubham Kumar	633/14	Delhi Metro Rail Corporation Limited
53	Sunil Kumar	143/14	NHPC
54	Abhishekh Mehra	153/14	NHPC
55	Nuthana Kalva Sumama	190/14	NHPC
56	Abhinandan	193/14	NHPC
57	Guarav Singh	144/14	HIM Technofore Limited
58	Vanshi Dhar Varshney	162/14	BHILAI Steel Plant
59	Russel Khajuria	148/14	HIM Technofore Limited
60	Satyam	126/14	HIM Technofore Limited
61	Jafer Sadiq	154/14	Hydro Electric Power Plant (Ladakh)
62	Karan Singh	172/14	BSP SAIL
63	Rahul Kumar	145/14	NHPC (Salal Power Station)
64	Vishesh Kukreja	200/14	Maruti Suzuki
65	Saiket Rashid	157/14	JKSRTC Pampore
66	Madan Mohan	196/14	BHEL
67	Piyush Gharde	152/14	BHEL
68	Deepak Kumar	125/14	BHEL

AY - 2018-19

Enroll . No.	Student Name	Name Of Industry	From	To	Days
Mech/01/15	AAKROSH KALSOTRA	Bharat Heavy Electrical Limited ,Ranipura, Haridwar	18-12-2015	31-01-2016	44
Mech/02/15	ABDUL MOOMIN	NTPC Limited	15-12-2015	15-01-2016	32
Mech/03/15	RAHUL THAPA	ONGC Limited Surat	08-12-2015	07-01-2016	30

Mech/04/15	DEEPANSHU KUMAR	Bharat Heavy Electrical Limited, Ranipura, Haridwar	18-12-2015	31-01-2016	44
Mech/05/15	ARSHAAN NAZIR	ONGC Limited Surat	15-12-2015	15-01-2016	32
Mech/06/15	VISHIVDEEP SINGH RAINA	Indian Oil Corporation Limited, Vadodara , Gujrat	07-12-2015	02-01-2016	27
Mech/07/15	NIRMAL KUMAR SWAMI	RINL, Pride Of Steel	25-01-2016	20-02-2016	27
Mech/08/15	RAHUL SHARMA	DRDO Ministry of Defence	11-01-2016	29-02-2016	50
Mech/09/15	UDAY SINGH MEENA	RINL, Prid of Steel	25-01-2016	20-02-2016	27
Mech/10/15	SAKHIL THAPPA	Maruti Suzuki Gurgaon	05-12-2015	16-01-2016	43
Mech/12/15	VINAYAK PUROHIT	Rourkela Steel Plant Odisa	04-01-2016	03-02-2016	31
Mech/13/15	SUMIT KUMAR	Maruti Suzuki Gurgaon	05-12-2015	16-01-2016	43
Mech/14/15	SANJAY YADAV	Bhushan Steel Ltd	28-12-2015	31-01-2016	35
Mech/16/15	NAMAN ADHIKARI	Indian Oil Corporation Limited,Vadodara ,Gujrat	07-12-2015	02-01-2016	27
Mech/17/15	SHUBAM	NhpcSalal Power Station	26-12-2015	01-02-2016	38
Mech/18/15	SHUBAM DOGRA	J&K State Road Transport Corporation	08-01-2016	22-02-2016	46
Mech/19/15	NIKHIL VERMA	Pwd Lucknow	15-12-2015	29-02-2016	46
Mech/20/15	MANMEET SINGH	Kanti Bijlee Utpadan Nigam Ltd.Kbun , Muzaffarpur	15-12-2015	13-01-2016	30
Mech/21/15	WASIF NISAR	Rourkela Steel Plant Odisa	04-01-2016	03-02-2016	31
Mech/22/15	GHAFOOR-UL-HAQ	Maruti Suzuki India Limited	05-12-2015	22-01-2016	49
Mech/23/15	MOHSIN AYOUB MIR	Maruti Suzuki India Limited	05-12-2015	16-01-2016	43
Mech/24/15	BASIT ALI SHAH	Indian Oil Corporation Limited,Vadodara ,Gujrat	07-12-2015	02-01-2016	27
Mech/25/15	VIPIN GUPTA	Indian Oil Corporation Limited,Vadodara ,Gujrat	07-12-2015	02-01-2016	27
Mech/26/15	NITIN AGRAWAL	Maruti Suzuki India Limited	05-12-2015	16-01-2016	43
Mech/27/15	IMTIYAZ AHMAD KUMAR	Bharat Heavy Electrical Limited ,Ranipura, Haridwar	18-12-2015	31-01-2016	45
Mech/29/15	VIVEK KUMAR	Salal Power Station Jyotipuram (Nhpc Ltd) Reasi J&K	31-12-2013	13-02-2014	43
Mech/30/15	SHIVAM GUPTA	Bharat Heavy Electrical Limited, Ranipura, Haridwar	18-12-2015	31-01-2016	45
Mech/31/15	AAKISH KUNDAL	Ck Birla Group NBC Flexible Solution	08-01-2016	22-02-2016	46
Mech/32/15	AADIL AHMAD RATHER	Indian Oil Corporation Limited, Vadodara ,Gujrat	07-12-2015	02-01-2016	27
Mech/33/15	PRASHANT DWIVEDI	Ck Birla Group Nbc Flexible Solution	08-01-2016	22-02-2016	46
Mech/34/15	AKSHAY SHARMA	Esrg Group	01-01-2016	10-02-2016	41
Mech/36/15	MUNISH KUMAR	Bharat Heavy Electrical Limited ,Ranipura, Haridwar	18-12-2015	31-01-2016	45
Mech/37/15	BASIT ALI	Rsb Transmission (I) Ltd	15-12-2015	14-02-2016	59

Mech/38/15	DHARAMSINGH MEENA	South Central Railway	17-01-2016	13-02-2016	28
Mech/40/15	YASIR SHABIR CHOUDHARY	Salal Power Station Jyotipuram (NHPC Ltd) Reasi J&K	26-12-2015	01-02-2016	36
Mech/42/15	ARSHJOT SINGH	Him Teknoforge Ltd	01-01-2016	10-02-2016	41
Mech/43/15	PRABHANJAN KUMAR MISHRA	Indian Oil Corporation Limited,Vadodara ,Gujrat	07-12-2015	02-01-2016	27
Mech/44/15	ANIL KUMAR	Maruti Suzuki India Limited	05-12-2015	30-01-2016	57
Mech/46/15	SAGAR VISHAV KARMA	Maruti Suzuki India Limited	05-01-2016	16-02-2016	43
Mech/47/15	PARAMJEET SINGH BIYYAL	Him Teknoforge Ltd	01-01-2016	10-02-2016	41
Mech/48/15	YOGESH KUMAR	Bhilai Steel Plant	14-12-2015	09-01-2016	27
Mech/49/15	VIVEK BHAL	Rourkela Steel Plant Odisha	04-01-2016	03-02-2016	31
Mech/50/15	RAMAN JAKHAR	Him Teknoforge Ltd	01-01-2016	10-02-2016	41
Mech/51/15	SIDDHARTH KUMAR	RSB	15-12-2015	14-02-2016	31
Mech/54/15	SATISH MALAV	Vizag Steel Plant	25-01-2016	20-02-2016	27
Mech/56/15	NIKHIL SHARMA	RSB	15-12-2015	14-02-2016	31
Mech/57/15	DEEPAK SINGH KANYAL	Indian Oil Corporation Limited	07-12-2015	02-01-2016	27
Mech/59/15	CHEVALA AVINASH	NHPC Salal Power Station	26-12-2015	01-02-2016	38
Mech/60/15	MOLU GURI VAMSHI	Maruti Suzuki India Limited	11-01-2016	27-02-2016	48
Mech/61/15	NITESH KHANDELWAL	Vizag Steel Plant	25-01-2016	20-02-2016	27
Mech/63/15	MAYANK VYAS	Vizag Steel Plant	25-01-2016	20-02-2016	27
Mech/66/15	NITISH RAJ	South Central Railway	17-01-2016	13-02-2016	28
Mech/67/15	ADITYA SHARMA	Maruti Suzuki India Limited	11-01-2016	26-02-2016	47
Mech/68/15	SAIF AKHTAR	Mithra Auto Agencies Pvt Ltd	18-01-2016	26-02-2016	40
Mech/69/15	BUDH SHARAN	Vizag Steel Plant	25-01-2016	20-02-2016	27
Mech/70/15	SUBHAM KUMAR SINGH	Nhpc Limited	07-01-2016	17-02-2016	42
Mech/71/15	REDDI NAVEEN	Vizag Steel Plant	25-01-2016	20-02-2016	27
Mech/72/15	PULKIT GAUR	South Central Railway	17-01-2016	13-02-2016	28
Mech/73/15	RAHUL KUMAR	NhpcSalal Power Station	26-12-2015	01-02-2016	38
Mech/74/15	ABHISHEK KAJLA	NhpcSalal Power Station	29-12-2015	06-02-2016	40
Mech/76/15	DILKHUSH MEENA	Ongc , Srikona	08-01-2016	06-02-2016	30
Mech/77/15	KULDEEP	Bhushan Steel Limited	28-12-2015	31-01-2016	35
Mech/78/15	VIKRAMJEET SINGH	BhelHaridwar	18-12-2015	31-01-2016	45
Mech/79/15	PRAVEEN SINGH TOMAR	BhelHaridwar	18-12-2015	31-01-2016	45
Mech/80/15	BRIJRAJ MALAV	Automag	01-01-2016	14-02-2016	45

Mech/81/15	NARENDRA KUMAWAT	Nhpc Limited	07-01-2016	17-02-2016	42
Mech/82/15	LOKENDRA SINGH JAITAWAT	Maruti Suzuki India Limited	05-01-2016	16-02-2016	43
Mech/83/15	HARASHI KRISHN SHUKLA	Him Teknoforge Ltd	01-01-2016	10-02-2016	41
Mech/85/15	RITIK RAJ VERMA	Bhilai Steel Plant	14-12-2015	09-01-2016	27
Mech/86/15	YOGESH KHICHI	Rourkela Steel Plant Odisha	04-01-2016	03-02-2016	31

AY - 2019-20

R. No.	Name Of The Student	Enroll No.	Industry/Institute	Duration
1	Krishna Kumar	14/16	SAMASTIPUR (BIHAR)	30th Dec 2018 To 3rd Jan 2019
2	Vaisakh Babu. S	15/16	VIZAG STEEL VISAKHAPATTANAM ANDHRA PRADESH	4 Weeks
3	Basit Ahmad Khan	21/16	SRTC JAMMU DIVISION	1st Jan 2019 To 28th Jan 2019
4	Hujat Masood Kirmani	31/16	ESCORTS-SHALIMAR ENGINEERING P. LTD	1st Dec 2018 To 31st Jan 2019
5	Abhishek Kumar Upadhyay	36/16	MARUTI SUZUKI INDIA PVT LTD (MANESAR PLANT)	18th Dec 2018 To 16th Jan 2019
6	Adil Ramzan	57/16	SRTC PAMPORE, KASHMIR	8th Nov 2018 To 6th Dec 2018
7	Dasari Tharun	64/16		
8	Pankaj Kumar	67/16	DIESEL LOCOMOTIVE TECHNOLOGY	4th Dec 2018 To 3rd Jan 2019
9	Souleh Sulaiman Wani	82/16	SRTC (PAMPORE J & K)	2nd Dec 2018 To 30 Dec 2018
10	Ayush Mishra	90/16	MARUTI SUZUKI INDIA LIMITED GURGAON PLANT	17th Dec To 24 Jan 2019
11	Mandeep Singh	102/16	MARUTI SUZUKI INDIA LIMITED GURGAON PLANT	17th Dec 2018 To 31st Jan 2019
12	Mohd Shoiab-Ul Hassan	106/16	PHED POONCH JAMMU	6 Months
13	Anurag Bhardwaj	109/16	RAIL COACH FACTORY, KAPURTHALA	June 2018 To Aug 2018
14	Mohammad Sarfaraz Ahanger	113/16	NFC HYDERABAD	31 Dec 2018 To 30 Jan 2019
15	Bhasker Koushal	114/16	MARUTI SUZUKI INDIA LTD.	15th December To 31st January
16	Amit Verma	118/16	IISC BANGALORE	06th Dec 2018 To 06th Feb 2019
17	Sanath Anand	120/16		
18	Akshum Dogra	128/16	SAIL (RSP)	6th Dec 2018 To 4th Jan 2019
19	Nikhil Kumar	133/16	IISC BANGALORE	Dec 2018 To Feb 2019
20	Vinay Bhasin	140/16	ELITE TECHNO GROUPS (KOTA RAJSTHAN)	20th Jan 2018 To 20th Feb 2018
21	Subham Kumar Jha	146/16	DIESEL LOCOMOTIVE TECHNOLOGY	4th Dec 2018 To 3rd Jan 2019
22	Arjun Attri	150/16	ONGC LTD., SCOPE MINAR, NEW DELHI	20th Dec 2018 To 18th Jan 2019
23	Rajpal Singh	154/16	IISC BANGALORE	Dec 2018 To Feb 2019
24	Atteb Ahmad	158/16	IISC BANGALORE	Jan 2019 To Feb 2020
25	Manik Tripathi	191/16	IISC BANGALORE	Dec 2018 To Feb 2019
26	Muzammil Hussain	195/16	IISC BANGALORE	10th Dec 2018 To 5th Feb 2019
27	Nitish Sharma	196/16	IISC BANGALORE	6th Feb 2018 To 6th Feb 2019
28	Manzoor Hussain	197/16	IISC BANGALORE	10th Dec 2018 To 5th Feb 2019
29	Kanav Sharma	198/16	IISC BANGALORE	6th Dec To 6th Feb 2019
30	Shubham Verma	211/16	IISC BANGALORE	11th Dec 2018 To 26th Jan 2019

31	Adil Fayaz	212/16	SRTC (PAMPORE, J & K)	13th Dec 2018 To 9th Jan 2019
32	Anil Pal	219/16	IISC BANGALORE	10th Dec 2018 To 5th Feb 2019
33	Gaurav Singh	222/16	DMSRDE (DRDO), KANPUR	2nd Jan, 2018 To 28th Feb, 2018
34	Abhay Kumar Jadav	229/16	IISC BANGALORE	10th Dec 2018 To 5th Feb 2019
35	Dheeraj Kumar	242/16	IISC BANGALORE	11th Dec 2018 To 26th Jan 2019
36	Aditya Narayan	251/16	GAIL AURAIYA	10th Dec 2018 To 6th Jan 2019
37	Akhil Sharma	252/16		
38	Amit Kumar	258/16	MARUTI SUZUKI MANESAR PLANT DELHI	1 Month
39	Haris Farooq	263/16	SRTC (PAMPORE J & K)	10th July 2018 To 7th August 2018
40	S. Amandeep Singh Bali	264/16	NHPC URI BARAMULLA J & K	12th July 2018 To 7th August 2018
41	Meruva Mani Kanteswara Reddy	277/16		
42	Dileep Tiwari	281/16	GURUGRAM,HARYANA	17 Dec 2018 To 28 Jan 2019
43	Shamas-U-Din Hajam	283/16	SAIL BHILAI, CHATTISGARH INDIA	9th Dec 2018 To 23 Dec 2018
44	Basharat Ahmad Wani	295/16	IISC BANGALORE	5th Dec 2018 To 5th Feb 2019
45	Shubham Sharma	313/16	NFC HYDERABAD	31 Dec 2018 To 30 Jan 2019
46	Sangam Chaurasiya	324/16	MARUTI SUZUKI INDIA LTD GURGAON (MANESAR PLANT)	17 Dec 2018 To 21 Jan 2019
47	Mahaveer Das	331/16	MUMBAI	1stDec To 31st Jan 2019
48	Sanjay Pal	333/16	DLW VARANASI	15 Dec 2018 To 17 Jan 2019
49	Alok Ranjan Yadav	345/16	MARUTI SUZUKI INDIA PVT LTD (MANESAR PLANT)	18th Dec 2018 To 16th Jan 2019
50	Krishna Kant Gautam	349/16	HINDUSTAN AERONAUTICS LIMITED,KORWA	Three Weeks
51	Raghav Khurana	354/16	MARUTI SUZUKI INDIA LIMITED, GURUGRAM	17th Dec 2018 To 31st January 2019
52	Ayaz Mohi-Uil-Din	358/16	IISC BANGALORE	6th Dec 2018 To 6th Feb 2019
53	Muneeb Ur .Rasool	376/16		
54	Himanshu Gupta	247/16	OIL AND NATURAL GAS LIMITED (ONGC) AHMEDABAD (GUJRAT)	19 Jan 2019 To 28 Feb 2019
55	Sumit Kashyap	383/16	DMW, PATIYALA (RAILWAYS)	1st Jan 2019 To 28th Jan 2019
56	Saurabh Singh	395/16	SAIL (RSP)	6th Dec 2018 To 4th Jan 2019
57	Ashwani Kumar Prajappati	402/16	SAIL (RSP)	6th Dec 2018 To 4th Jan 2019
58	Sanjay Kumar	75/15-16	JODHPUR (RAJSTHAN)	2th Jan To 6th Feb

Post-training assessment of the practical training is evaluated at the end of the 7th semester by a committee constituted by the HOD. The students give a PPT wherein they provide a detailed report of the work done. An interaction session follows the presentation. The students are compulsorily supposed to submit a hard copy of the work done and are maintained in the department as a record. The credits are awarded based on the presentation, interaction and practical training record.

DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Rubrics for Practical Training and Professional Viva
MEC 707, Total Marks: 100, Credits: 2

Rubrics/Parameters	Allocated Marks	Excellent (15-20)	Good (8-14)	Average (0-7)
R1: Industry Orientation/Skills Learnt/Practical Experience/Advanced Tools/Latest Technology Used	20			
R2: Quality of Material Presented/Work Done/Level of Difficulty/Innovation	20			
R3: Presentation of the work done/ Presentation Skills	20			
R4: Quality of the Report Writing	20			
R5: Depth of Knowledge and Skills (Professional Viva)	20			

C. Impact Analysis of Industrial Training

The students are provided with the feedback forms to rate their industrial training/internship. It is done to identify the level of achievement.

The feedback is obtained from the students at the end of the 7th semester to assess the achievement of the objectives of the industrial training/ summer training/internship/ industrial tour.

DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Guidelines for preparing Practical Training/Internship Report

After completion of the mandatory training/internship, a detailed technical report in hard-copy (soft binding) shall be prepared individually and submitted with the following formatting guidelines – *length: at least 4 pages, single-column, single-spaced, 1-inch margins on all sides, font size: 12, font type: arial, section headings: bold, text formatting: justified, proper bulleted/numbered list.* The report should explain the technical specifications of the tasks done, the processes and procedures followed, language/tools/environment of development, to what extent the work involved the use of mechanical engineering skills, what skills the student gained from the internship, etc. Individual items of equipment, special attachment, indigenously adopted tools, etc. should also be described. Drawings, sketches, specification of equipment used, should also be reported wherever essential. The report should contain entire studies & discussions carried out by the students in addition to what he/she has observed during his/her day to day work.

Note: *Hastily/poorly written documents that have grammar/spelling mistakes and those without much technical content will NOT be considered.*

The report should include the following:

1. The basic history/introduction of the industry/institute/department/lab.
2. The sequence of operations followed/systems introduced for the production/experimentation.
3. The layout of various workshop/floors/labs of the industry/institute/department.
4. The major equipment used for the production/assembly/maintenance/repair/quality control/experiments/R&D, etc.
5. The infrastructure available with the industry/institute/department/lab.
6. The movement of material (raw, semi-finished and finished product), not applicable in case of software industry.
7. The formulation of 3 to 4 practical problems.
8. Data required to formulate the problems.
9. Analysis of the data, and steps required.
10. Suggestions made based on the analysis of the data, processes, and procedures.
11. Recommendations.
12. Certificate from the industry for the period of training undergone.

The following titles must be incorporated in the report:

1. Title Page (Should include the Topic, Industry Name, Institute Logo, Name of the Student, Enrol no., Department)
2. Preface/Acknowledgement
3. Certificate with Signatures and Seal of the Industry Person
4. Contents/Index
5. Introduction about the Industry/Institute/Department/Lab.
6. Training Schedule
7. Specific Assignment/Project Handled
8. Work Done/Observations
9. Learning after Training
10. Summary

Department of Mechanical Engineering
National Institute of Technology Srinagar

NOTICE

30.09.2020

All the students of 7th semester, B. Tech. Mechanical Engineering, are hereby informed that the evaluation of Practical Training and Professional Viva (MEC 707) shall be done in two phases.

Phase I would involve evaluation of the work done during the practical training as per the attached schedule. Prepare a presentation of 5 to 10 slides (individually) detailing the objectives and the work done. Submit the report (soft copy) on the day of your presentation in the desired format only.

Phase II would involve the conduct of professional viva towards the end of the semester (Tentatively on 25.11.2020). This includes a general viva from any topic that you have studied until 6th semester.

Note that the following documents have been shared with the class representative:

1. Rubrics for evaluation of practical training (The performance would be evaluated based on these rubrics).
2. The guidelines for practical training report preparation.

30.09.2020

Coordinator
Practical Trainings and Professional Viva (MEC 707)
Department of Mechanical Engineering
NIT Srinagar

Copy to:
1. Head, ME for information via email
2. Coordinator 7th Semester for information via email
3. Class Representative, 7th Semester, B.Tech. via email

D. Student Feedback on Initiative

The students' feedback is obtained at the end of the 8th semester to evaluate industrial training effectiveness. The feedback is evaluated and action is taken accordingly. The action includes.

- The management of the industry is informed formally regarding the feedback so that the corrective action (if required) is taken by the management so that the quality of the industrial training does not get affected.
- If the students are not satisfied with the training imparted in the industry, the students are not permitted to undergo training in that industry in the future.

The following procedure is adopted toasses the industrial training feedback

Feedback Form to Assess the Industrial Training **Name of the student:** **Enrollment No:** **Name of the Company where undergone training:** Excellent 3 Good 2 Average 1	**Response**
1. Rank the departmental initiative about the seriousness regarding industrial training etc.	
2. Did the faculty help you in choosing the proper industry	
3. Rank the exposure to the practical working environment	
4. Did you become aware of the practical aspects of the Industry	
5. Did you notice some interesting facts and new technologies adopted in the industry	
6. Would you suggest your juniors to undergo training there	
7. Do you want to join this industry as a permanent employee	
8. Did you get hands-on experience in the facilities in the plant?	
9. Did you become aware of any new technologies concerning what they have learned in the corresponding subject?	

$$cumulate\ response\ of\ the\ question = \frac{3 * N_1 + 2 * N_2 + 1 * N_3}{3 * (N_1 + N_2 + N_3)}$$

where N_1, N_2 *and* N_3 are the number of students responding with 1, 2 and 3 respectively

	Response on 3 point scale								
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
2017-18	2.9	2.8	2.8	2.8	2.7	2.8	2.9	2.9	2.9
2018-19	2.8	2.8	2.8	2.9	2.8	2.9	2.9	2.8	2.8
2019-20	2.8	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.7

ANNEXURE-I

1. **Alumni Survey (Link: https://forms.gle/EPrWB9tR2dnpoHPz9)**

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 the Mechanical Engineering Department, National Institute of Technology, Srinagar, prepares 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 a 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		
Signature		**Suggestion if any:**

ANNEXURE-II

2. Employer Survey (Link: https://forms.gle/TGYvkUTXys4Adckb6)

Mechanical 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 the 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 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.			

ANNEXURE III
In Program Students Survey (Link: https://forms.gle/TL3ZowZtUGp4zM5H8)

National Institute of Technology, Srinagar **Mechanical 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)			
1	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***
2	Ability to apply analytical skills to engineering problems. *If not satisfied give your suggestions to improve*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***
3	Ability to conduct experiments, analyse data, and present results. *If not satisfied give your suggestions to improve*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***
4	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***
5	Ability to use modern technologies and tools necessary for practice. *If not satisfied give your suggestions to improve*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***
6	Ability to understand global issues related to engineering. *If not satisfied give your suggestions to improve.*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***

7	Understand the importance of ethical and professional responsibility. *If not satisfied give your suggestions to improve*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***
8	An ability to function on multi-disciplinary teams. *If not satisfied give your suggestions to improve*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***
9	An ability to communicate effectively. *If not satisfied give your suggestions to improve*		
	Extremely Satisfied	***Satisfied***	***Not Satisfied***
10	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***

Signature:
Date:

ANNEXURE IV

Exiting Students Survey (Link: https://forms.gle/KML1j5qnZMr2YegQ7)

Mechanical Engineering Department **National Institute of Technology, Srinagar** **Exiting Students Survey**			
Name:		En. Roll.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, design, analyse and solve mechanical engineering problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
3	Design/ development of complex engineering problems and their solutions		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
4	Use of research-based knowledge and research methods		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
5	Demonstrate the ability to apply advanced technologies to solve contemporary and new problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
6	Awareness to apply engineering solutions in global, national and societal contexts		
	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 integrate theory and practice to construct systems of varying complexity		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
14	Ability to apply mechanical engineering skills, tools and mathematical techniques to analyse, design and model complex systems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
15	Ability to design and manage small-scale projects to develop a career in mechanical engineering		
	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:

Signature:

ANNEXURE V
COURSE APPRAISAL/FEEDBACK FORM

COURSE NO & TITLE DATE
INSTRUCTOR'
NAME SEM:
PLEASE TICK IN THE APPROPRIATE BOX

Sr. No.	Course organisation	Range	5	4	3	2	1	
1	Were the objectives of 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 oral presentation	Excellent						Poor
7	Did the instructor encourage think logically and objectively?	Very much						Never
8	Was the instructor's response to the questions asked in the class satisfactory?	Very much						Not at all
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 (minor 1 &II) and feedback improve the understanding of this course?	Always						Rarely

Would you rate this course as one of the five best courses you have had so far? Yes/ No

If you have any further comments not covered by this questionnaire, please write below

ANNEXURE VI

OFFICE OF DEAN ACADEMIC AFFAIRS
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

ACADEMIC CALENDAR FOR THE YEAR-2020

SPRING-2020			
REGISTRATION & COMMENCEMENT OF CLASSES			
1.	**Registration for U.G**	**Date of Registration**	**Commencement of Classes**
2.	2nd semester 4th semester 6th semester 8th semester	9 & 11 March, 2020 12-13 March, 2020 16-17 March, 2020 9 & 11 March, 2020	12th March, 2020 16th March, 2020 18th March, 2020 12th March, 2020
3.	Registration for P.G & Ph .D	9 & 11 March, 2020	12th March, 2020
4.	**Registration with late fee :** For next 04 days after the last permissible registration date(s) @ Rs.400/- per day in each category and Rs.800/- for next subsequent four days.		
5.	Sports Week		11-04-2020 to 13-04-2020
6.	Mid-Term Examinations		04-05-2020
7.	Advertisement for admission to: a) M. Tech (sponsored category) b) Ph. D		Last week of May
END-TERM EXAMINATIONS			
8.	B. Tech Project Viva-Voce & Practical Examinations		Last week of May
9.	B. Tech 8th Semester End- Term Examination		01-06-2020
10.	UG, PG & Ph. D End Term Examinations		15-06-2020
11.	Registration for Supplementary Exam. (Even Semester)		01-06-2020 to 10-06-2020
12.	Registration for Supplementary Exam. (Odd Semester)		15-06-2020 to 26-06-2020
13.	Supplementary Examination (Odd Semester)		02-07-2020
AUTUMN-2020			
REGISTRATION & COMMENCEMENT OF CLASSES			
1.	Registration for U.G, P.G, & Ph .D		29-07-2020 to 31-07-2020
2.	Registration with late fee @ Rs.400/=per day		Upto 05-08-2020
3.	Commencement of classes for all semesters		03-08-2020
4.	Fresher's Orientation day		23-08-2020
5.	Techvaganza		05-09-2020
6.	Midterm Examinations		14-09-2020
7.	Convocation		Date to be decided
8.	National Entrepreneurship Day		Date to be decided
END-TERM EXAMINATIONS			
9.	End Semester Examinations		From 09-11-2020
10.	Registration for Supplementary Exam. (Odd Semester)		19-10-2020 to 29-10-2020
11.	Registration for Supplementary Exam. (Even Semester)		09-11-2020 to 19-11-2020
12.	Supplementary Examinations for (Even Semester)		From 23-11-2020
13.	Winter Vacations for Students		07-12-2020

(Dr. G. R. Beigh)
Associate Dean Examination

(Prof. (Dr.) Kowsar Majid)
Dean Academic Affairs

Dean Academic Affairs
National Institute of Tech. Srinagar
Hazratbal, Sgr - Kashmir 190006

Academic Calendar 2019			
S No.	Activity	Date	
		From	To
1	Reopening of Institute for Faculty	18-02-2019	
	Registration for U.G. P.G & P.hD.	18-02-2019	22-02-2019
	Registration with late fee @ Rs1400/=per day	25-02-2019	28-02-2019
	Commencement of classes	25-02-2019	
2	Mid-Term Examinations	18-04-2019	
3	Techvaganza	27-04-2019 & 28-04-2019	
4	Advertisement for admission to: a) M. Tech (sponsored category) b) Ph. D	3rd Week of May	
End Term Examination			
5	B. Tech 8th Semester	From 25-05-2019	
	B. Tech Project viva-voce Exam	10-06-2019 to 13-06-2019	
	Registration for Supplementary Examinations with Regular candidates	03-06-2019 to 07-06-2019	
	B. Tech. 2nd, 4 & 6 M. Tech /M.Sc. 2nd & 4th semesters and PhD	From 10-06-2019	
6	Registration for Supplementary Examinations (Odd Semester)	24-06-2019 to 02-07-2019	
7	Supplementary Examinations for odd Semesters	From 04-07-2019	
8	Registration for Special Supplementary Exam for 8th Semester	01-07-2019 to 11-07-2019	
9	Special Supplementary Examinations for 8th Semester	15-07-2019	
10	Summer Break	23-06-2019	28-07-2019
AUTUMN-2019			
Registration and Commencement of Classes			
1	Registration for U.G.,P.G.& Ph.D.	29-07-2019	01-08-2019
	Registration with late fee @ Rs.400/=per day	Upto 05-08-2019	
	Commencement of classes	01-08-2019	
2	Fresher's Orientation day	20-08-2019	
3	Sports Event	06-09-2019	08-09-2019
4	Midterm Examinations	16-09-2019	
5	Convocation	28-09-2019	
6	National Entrepreneurship Day	09-11-2019	
End-Term Examination			
7	Practical Examinations	1st Week of November	
8	Registration for Supplementary Examinations with Regular candidates	1-11-2019 to 07-11-2019	
9	End Semester Examinations	From 11-11-2019	
10	Registration for Supplementary Examinations (Even Semester)	20-11-2019 to 28-11-2019	
11	Supplementary Examinations for Even Semesters	From 01-12-2019	

12	Winter Vacations for Students	10-12-2019	

Academic Calendar for the year 2018

ACTIVITY	Date	
REGISTRATION	From	To
B.Tech. 8th semester	19-02-2018	21-02-2018
Registration with late fee @ Rs. 400/= per day	Up to 26-02-2018	
B.Tech.. 2nd 4th& 6th semesters and M.Tech./ M.Sc. 2nd& 4th and Ph.D.	26-02-2018 to 28-02-2018	
Registration with late fee @ Rs. 400/= per day	Up to 05-03-2018	
COMMENCEMENT OF CLASSES		
Commencement of Classes for B.Tech.. 8th semester	22-02-2018	
Commencement of Classes for B.Tech.. 2nd& 4th , 6th semesters and M.Tech./ M.Sc. 2nd& 4th and Ph.D.	01-03-2018	
Extra-Curricular Activities	28-04-2018 to 30-04-2018	
Alumni meet-2018	28-04-2018 to 29-04-2018	
B.Tech.. 8th Semester	16-04-2018 to 21-04-2018	
B.Tech.. 2nd,4th& 6th; M.Tech./M.Sc. 2nd& 4th semesters and Ph.D..	23-04-2018 to 28-04-2018	
ANNUAL DAY	01-05-2018	
PRACTICAL EXAMINATIONS		
B.Tech.. Project viva-voce Exam	11-06-2018 to 12-06-2018	
M.Tech. Dissertation Viva-voce Exam	1st week of July-2018	
END SEMESTER		
B.Tech.. 8th	28-05-2018	
B.Tech.. 2nd, 4th& 6th; M.Tech. / M.Sc. 2nd& 4th semesters and Ph.D.	19-062018	
Advertisement for Ph.D. admissions	Last week of May-2018	
Supplementary Examinations for odd semester	From 02-07-2018	
Summer Break	10-07-2018	22-07-2018
Special Supplementary Examinations for 8th semester	16-07-2018	

Academic Calendar for the year 2017-2018 (Autumn session)

Registration for U.G., P.G. & Ph.D.	**23-07-2018 to 25-07-2018**
Registration with late fee @Rs 400/= per day	Up to 30-07-2018
Commencement of classes	26-07-2018
Extracurricular activity	07-09-2018 to 15-09-2018
Midterm examination	10-09-2018 to 15-09-2018
Convocation	22-09-2018
Alumni meet Delhi chapter	29-09-2018 to 30-09-2018
Tech fest/ECA	13-10-2018 to 15-10-2018
National innovation day	15-10-2018
Practical examination	1st week of November
National Entrepreneur day	09-11-2018
End semester examination	From 12-11-2018
Supplementary examinations for even semester	From 26-11-2018
Winter vacation for students	10-12-2018

Adherence to Academic Calendar Year 2017-2018

Month	Date	Activities Planned
February	19-02-2018 to 21-02-2018	Registration B.Tech.. 8th Semester (Spring 2018 session)
	22-02-2018	Commencement of classes for B.Tech.. 8th Semester
	22-02-2018 to 26-02-2018	Registration with late fee B.Tech.. 8th Semester (Spring 2018 session)
	26-02-2018 to 28-02-2018	Registration B.Tech.. 2nd, 4th and 6th Semesters, M.Tech./M.Sc. 2nd and 4th and Ph.D. (Spring 2018 session)
March	01-03-2018 to 05-03-2018	Registration with late fee B.Tech.. 2nd, 4th and 6th Semesters, M.Tech./M.Sc. 2nd and 4th and Ph.D. (Spring 2018 session)
	01-03-2018	Commencement of classes for B.Tech.. 2nd, 4th and 6th Semesters, M.Tech./M.Sc. 2nd and 4th and Ph.D..
April	16-04-2018 to 21-04-2018	Mid-Term exam B.Tech.. 8th Semester
	23-04-2018 to 28-04-2018	Mid-Term exam B.Tech.. 2nd, 4th and 6th Semesters, M.Tech./M.Sc. 2nd and 4th and Ph.D..
	28-04-2018 to 29-04-2018	Alumni Meet-2018
	28-04-2018 to 30-04-2018	Extra-Curricular Activities
May to Dec	01-05-2018	Annual Day
	Activities planned for months to come	