

CRITERION 7	Continuous Improvement	Max. Marks	75
		Institute Marks	69

7.1. Actions taken based on the results of evaluation of each of the POs & PSOs
(27/30)

POs & PSOs Attainment Levels and Actions for improvement – CAY 2019 – 2020

PO's	Target Level (70%)	Attainment Level	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO 1	1.93	2.31	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: In Engineering Graphics and Computer Modelling, tutorial session will be conducted based on previous evaluation and performance.			
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	1.72	2.05	Attainment level has been achieved. The following actions are made in order to sustain the attainment level.
Action Taken: In Mechanics of Solids, application oriented problems will be offered to improve logical thinking.			
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			

PO3	1.62	1.97	Attainment level has been achieved. The following actions are made in order to sustain the attainment level
Action Taken: Students were motivated to Enroll in the NPTEL classes on Manufacturing Technology.			
PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	1.45	1.65	Attainment level has been achieved. The following actions are made in order improve the attainment level.
Action Taken: Students are encouraged to do internships within the country in premier Institutes of learning and industry in order to get exposed to newer areas of research.			
PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO5	1.44	1.78	Attainment level has been achieved. The following actions are made in order to maintain the attainment level.
Action Taken: Labs are modernized & developed to inculcate the image of modern analytical & computational tools like ANSYS, Autodesk.			
PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			

PO6	1.44	1.59	Attainment level has been reached. The following actions are made in order to improve the attainment level.
Action Taken: Awareness on fire and safety was given as the topic of 'responsibility for engineers in safety'.			
PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7	1.47	1.73	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Projects addressing the global energy & environmental issues are prepared to be taken up by the students with a focus on consumption, utilization & proper management of energy.			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	1.32	1.47	Attainment level has been reached. The following actions are made in order to achieve the next target level.
Action Taken: Motivational talks, cooperative lectures & programs of mutual & ethical practices are arranged in order to inculcate professional ethics & sense of honesty in students.			
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO 9	1.47	1.76	Attainment level has been reached. The following actions are made in order to maintain this attainment level.

Action Taken: Students are given group assignments and minor projects to groom the individual and teamwork skills.			
PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	1.52	1.78	Attainment level has been reached. The following actions are made in order to maintain this attainment level.
Action Taken: Group discussions, seminars, presentations and soft skills training programs are organized through online mode in order to enhance the aspects of communication/skills.			
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	1.51	1.56	Attainment level has been achieved. The following actions are made to improve the attainment level.
Action Taken: Project hours are included in the curriculum for project work.			
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.			
PO 12	1.57	1.89	Attainment level has been reached. The following actions are made in order to sustain this attainment level.

<p>Action Taken: Students were motivated to enrol for higher studies in the premier institutes of learning in their respective field.</p>			
<p>PSO1: Apply the knowledge of basic sciences, mathematics and Mechanical Engineering to real life problems.</p>			
PSO1	1.66	2.03	Attainment level has been reached. The following actions are made in order to improve the attainment level.
<p>Action Taken: Students are encouraged to take the projects related to real life Engineering problems in the final year.</p>			
<p>PSO2: Impart the advance level skills in academic and research pursuits relevant to Mechanical Engineering and interdisciplinary streams.</p>			
PSO2	1.53	1.79	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: Students are encouraged to go for higher studies in premier institutes of learning like IIT/IISC to get exposed to newer areas of research.</p>			
<p>PSO3: To integrate major Mechanical Engineering streams with innovative and entrepreneurial activities ensuring high standards of professional ethics</p>			
PSO3	1.37	1.66	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: Students are encouraged to participate in competitions on technical projects held at national level.</p>			
<p> </p>			

POs & PSOs Attainment Levels and Actions for improvement – CAY-1 (2018 – 2019)			
POs	Target Level	Attainment Level	Observations
PO1: Engineering knowledge: Apply the knowledge of applied mathematics, science & technology, engineering fundamentals and an engineering specialization to the solution of complex practical engineering problems.			
PO 1	1.76	2.33	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action taken: <ol style="list-style-type: none"> In Engineering Graphics and Computer Modelling, tutorial session will be conducted based on previous question papers. In Introduction to Mechanical Engineering, bridge course will be offered for reinforcing their knowledge about engineering fundamentals. 			
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO 2	1.57	2.02	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: <ol style="list-style-type: none"> In Mechanics of Solids, application oriented problems will be offered to improve logical thinking. In Thermodynamics, tutorial session will be taken for application in the real life problems. 			
PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO 3	1.47	1.89	Attainment level has been reached. The following actions are made in order to sustain this attainment level.

<p>Action Taken:</p> <p>1. NPTEL classes were arranged for Manufacturing Technology.</p>			
<p>PO4: Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions</p>			
PO 4	1.32	1.66	Attainment level has been achieved. The following actions are made in order to improve the attainment level.
<p>Action Taken:</p> <p>1. Students are encouraged to do internships in premier institutes of learning/high end industry in order to get exposed to newer areas of research.</p> <p>2. Ensure the quality of seminars and projects undertaken by the students at undergraduate level.</p>			
<p>PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.</p>			
PO 5	1.31	1.76	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken:</p> <p>1. Labs are modernized & developed to inculcate the image of modern analytical & computational tools like ANSYS, Autodesk.</p> <p>2. Students are encouraged to take B.Tech projects based on practical work such as fabrication & design.</p>			
<p>PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</p>			
PO 6	1.31	1.55	Attainment level has been reached. The following actions are made in order to sustain this attainment level.

Action Taken:			
<ol style="list-style-type: none"> 1. Awareness on fire and safety will be given to the topic ‘responsibility of engineers in safety’ 2. Through the IIEDC cell of the institute, the departmental facilities have been extended to the entrepreneurs to test their ideas. 3. Students were promoted to give away their time for charity works. 			
PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO 7	1.33	1.78	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken:			
<ol style="list-style-type: none"> 1. Projects addressing the global energy & environmental issues are prepared, to be taken up by the students with a focus on consumption, utilization & proper management of energy. 2. Proper guiding is given to the students to implement projects leading to right selection and optimized material that lead to a sustainable environment. 			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO 8	1.20	1.50	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken:			
Motivational talks, interactive lectures & programs on ethical practices are arranged in order to inculcate professional ethics & sense of honesty in students.			
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO 9	1.33	1.74	Attainment level has been achieved. The following actions are made in order to sustain the attainment level.
Action Taken:			
Students are given group assignments and minor projects in order to groom the individual and team work skills.			

<p>PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.</p>			
PO10	1.38	1.75	Attainment level has been achieved. The following actions are made in order to sustain the attainment level.
<p>Action Taken: Group discussions, seminars, presentations and soft skill training programmes are organized to enhance the aspects of communication/skills.</p>			
<p>PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.</p>			
PO11	1.37	1.63	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: 1. Project hours are included in the curriculum for project work. 2. Students are encouraged to handle financial management during Technical & Non –Technical Festivals.</p>			
<p>PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p>			
PO12	1.43	1.85	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: Students were motivated to Enrol for higher studies.</p>			
<p>PSO1: Apply the knowledge of basic sciences, mathematics and mechanical engineering to real life problems.</p>			

PSO1	1.51	2.06	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students are encouraged to take projects related to the real life problems in the final year.			
PSO2: Impart the advance level skills in academic and research pursuits relevant to Mechanical Engineering and interdisciplinary streams.			
PSO2	1.39	1.83	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: 1. Students are encouraged to go for higher studies in premier institutes of learning like IIT/IISC to get exposed to newer areas of research.			
PSO3: To integrate major Mechanical Engineering streams with innovative and entrepreneurial activities ensuring high standards of professional ethics			
PSO3	1.24	1.67	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students are encouraged to participate in competitions on technical projects held at national level.			

POs & PSOs Attainment Levels and Actions for improvement – CAY-2 (2017 – 2018)

PO's	Target Level	Attainment Level	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			

PO 1	1.60	2.37	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: In Engineering Graphics and Computer Modelling, tutorial session will be conducted based on previous evaluation and performance.			
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	1.42	2.06	Attainment level has been achieved. The following actions are made in order to sustain the attainment level.
Action Taken: In Mechanics of Solids, application oriented problems will be offered to improve logical thinking.			
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	1.34	1.95	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students are asked to enroll in the online NPTEL classes for various subjects.			
PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	1.2	1.70	Attainment level has been achieved. The following actions are made in order to sustain the attainment level.

<p>Action Taken: Students are encouraged to do internships in premier institutes of learning and industry in order to get exposed to newer areas of research.</p>			
<p>PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.</p>			
PO5	1.19	1.80	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: Labs are modernized & developed to inculcate the image of modern analytical & computational tools like ANSYS, Autodesk.</p>			
<p>PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</p>			
PO6	1.19	1.59	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: Awareness on fire and safety will be given as the topic of ‘responsibility for engineers in safety’.</p>			
<p>PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.</p>			
PO7	1.21	1.79	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
<p>Action Taken: Projects addressing the global energy & environmental issues are prepared to be taken up by the students with a focus on consumption, utilization & proper management of energy.</p>			

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	1.09	1.51	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Motivational talks, cooperative lectures & programs of mutual & ethical practices are arranged in order to inculcate professional ethics & sense of honesty in students.			
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO 9	1.21	1.73	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students are given group assignments and minor projects to groom the individual and team work skills.			
PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	1.26	1.77	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Group discussions, seminars, presentations and soft skills training programmes are organized to enhance the aspects of communication/skills.			
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			

PO11	1.24	1.61	Attainment level has been achieved. The following actions are made in order to sustain the attainment level.
Action Taken: Project hours are included in the curriculum for project work.			
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.			
PO 12	1.30	1.87	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students were motivated to enroll for various motivational speeches available in online platform.			
PSO1: Apply the knowledge of basic sciences, mathematics and Mechanical Engineering to real life problems.			
PSO1	1.37	2.10	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students are encouraged to take projects related to the real life problems in the final year.			
PSO2: Impart the advance level skills in academic and research pursuits relevant to Mechanical Engineering and interdisciplinary streams.			
PSO2	1.26	1.87	Attainment level has been reached. The following actions are made in order to sustain this attainment level.
Action Taken: Students are encouraged to go for higher studies in premier institutes of learning like IIT/IISC to get exposed to newer areas of research.			

PSO3: To integrate major Mechanical Engineering streams with innovative and entrepreneurial activities ensuring high standards of professional ethics			
PSO3	1.13	1.69	Attainment level has been reached. The following actions are made in order to sustain the attainment level.
Action Taken: Students are encouraged to participate in competitions on technical projects held at national level.			

PO's	Attained Values 2017 – 2018	Attained Values 2018 – 2019	Attained Values 2019 – 2020
1	2.37	2.33	2.31
2	2.06	2.02	2.05
3	1.95	1.89	1.97
4	1.70	1.66	1.65
5	1.80	1.76	1.78
6	1.59	1.56	1.59
7	1.79	1.78	1.73
8	1.51	1.50	1.47
9	1.73	1.74	1.76
10	1.77	1.75	1.78
11	1.61	1.63	1.56
12	1.87	1.85	1.89
PSO1	2.10	2.06	2.03
PSO2	1.87	1.83	1.79
PSO3	1.69	1.67	1.66

7.2 Academic Audit and actions taken thereof during the period of Assessment: (14)

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

No Academic Audit was carried out due to following reasons:

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

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

(a) Course files Evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
<p>1. Formulation of Departmental Undergraduate Committee (DUGC) at the start of each session with HOD as a chairman, selected faculty of the department as members of the committee and one senior faculty from a sister department as Directors nominee.</p> <p>2. Formation of Programme Assessment committee (PAC) at the start of each semester consisting of HOD as chairman and two senior faculties as members.</p>	<p>1. The DUGC during their random checks of the lecture halls, observe and check the mode of delivery of course material by a concerned faculty member. Emphasis is given to the delivery of lectures as per the lesson plan, teaching aids used, communication skills and classroom management etc.</p> <p>2. Regular analysis of the results of mid-semester and end semester examinations of all subjects is done.</p>	<p>Faculty members incorporate the changes suggested by the DUGC and PAC for any gaps and recommends actions to be initiated to ensure quality deliverables.</p>	<p>1. Faculty members have to match the pace of their deliverables as per the student's requirements as well as they have to schedule the lecture plans in such a way that the syllabus is completed in time. To achieve this they can arrange extra lectures on appropriate times.</p> <p>2. Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of teaching-learning.</p> <p>3. Regular analysis of the results of mid-term and major examinations of all subjects is done and concerned faculty is guided to initiate necessary actions.</p> <p>4. Remedial classes are scheduled in reference to academic progress of the student, who appear for supplementary examinations</p>

(b) Theory / Lab Evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
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<p>1 Formulation of Departmental Undergraduate Committee (DUGC) at the start of each session with HOD as a chairman, selected faculty of the department as members of the committee and one faculty from a sister department as Directors nominee.</p> <p>2. Formation of Programme Assessment committee (PAC) at the start of each semester consisting of HOD as chairman and two senior faculties as members.</p>	<p>1. The committee performs audit of laboratory files i.e. verify the contents of the lab course file, experimental plan, evaluation procedure etc.</p> <p>2. The PAC take a random checks of the laboratories during experiments to get ready information to assess the quality of the delivery and evaluation.</p> <p>3. Moreover a safety audit is conducted by the PAC in addition to the conduct of laboratory experiments in proper and fruitful manner.</p>	<p>The parameters are assessed to ensure the teaching methods of benchmarked standards are being used throughout the institute. Feedback is communicated to the concerned faculty member.</p>	<p>Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of Experimentation & exposure to newer techniques of analysis. The FDPs are carried out at the institute level itself by the learning and development team mainly sponsored under TEQIP-III.</p>
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(c) Academic Audit Report through Internal Quality Audit Cell.

In addition to the above exercise an academic audit by the IQAC from inter department of the institute was initiated from the year 2017 onwards. The report and the actions taken are summarized as under:

Auditors Names:

1. Dr. M. F. Wani

Professor & Ex. Head, Department of Mechanical Engg., N.I.T Srinagar.

2. Dr. G. A. Harmain

Professor & Ex. Head, Department of Mechanical Engg., N.I.T Srinagar

Date of Audit: 17-05-2019

<i>Proposed</i>	<i>Action</i>
<ul style="list-style-type: none"> ○ Purchasing of departmental sophisticated instruments and other consumables and non consumable items. 	Several numbers of instruments, consumable and non consumables Items have been purchased as mentioned in the budgetary details
The trend started by department faculty members of publishing research papers in reputed journals like Elsevier, Springer, Taylor-Francis should be encouraged amongst PhD and M.Tech students.	The trend has been taken initiated as suggested and for details of published papers given in criteria 5.
The department should initiate interaction with industries present in J&K as well as other parts of the country in form of lectures from industrial personnel, academia-industry interaction sessions/workshops.	The department has initiated conducting workshop / STC's etc. In last 3 years 3 STC's and 2 workshops were conducted
Efforts should be made to Interact students with visiting faculties from eminent industries and academia.	The suggestion has been widely implemented. Number of faculty members were visited.
Computational facilities of the department should further be augmented with addition of high end computational facilities, cluster computing, servers, etc. Computer lab with Mechanical engineering related softwares such as ANSYS WORKBENCH, APDL, COMSOL, MATLAB, AUTODESK INVENTOR, SOLIDWORKS etc should be established. Moreover both undergrad and postgrad students should be given projects that would acquaint them with these software's, to increase their employability and motivate them to further research.	Many CAD software were purchased, a few are in pipeline (Tendered).
Books in the central library regarding Mechanical Engineering should be increased. Further, the students may be issued six textbooks for the entire semester, three references and research books for maximum 15 days. Digitisation of library may be done on priority basis and linked to the department computers.	Implemented as proposed/suggested.
Subscription to Mechanical engineering journals should be increased for benefit of research	Implemented as suggested

students and faculty.	
Faculty members were encouraged to submit sponsored research proposals to various central and state funding agencies like DST, CSIR, MHRD, MOEF, DAE, DRDO, Council of Science and Technology J&K, etc.	Several research proposals have been submitted by the departmental faculty members.

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

(a) Course files Evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
<p>1. Formulation of Departmental Monitoring Committee (DMC) at the start of each session with HOD as a chairman, course coordinator and few of departmental faculty members.</p> <p>2. Formation of Programme Assessment committee (PAC) at the start of each semester consisting of HOD as chairman and two senior faculties as members.</p>	<p>The DMC during their random checks of the lecture halls, observe and check the mode of delivery of course material by a concerned faculty member. Emphasis is given to the delivery of lectures as per the lesson plan, teaching aids used, communication skills and classroom management etc.</p>	<p>Faculty members incorporate changes suggested by the DMC and PAC for any shortfalls and suggest and recommend actions to be initiated to ensure quality deliverables.</p>	<p>1. Faculty members have to match the pace of their deliverables as per the student’s requirements as well as they have to schedule the lecture plans in such a way that the syllabus is completed on time. To achieve this they can arrange extra lectures on appropriate times.</p> <p>2. Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of teaching-learning.</p> <p>3. Regular analysis of the results of mid-term and major examinations of all subjects is done and concerned faculty is guided to initiate necessary actions.</p> <p>4. Remedial classes are scheduled in reference to academic progress of the student, who appear for supplementary examinations</p>

(b) Theory/ Lab evaluation

Frequency	Conduct Mechanism	Action Plan	Implementation
<p>1. Formulation of Departmental Monitoring Committee (DMC) at the start of each session with HOD as a chairman, course coordinator of the laboratory and few of departmental senior faculty members.</p> <p>2. Formation of Programme Assessment committee (PAC) at the start of each semester consisting of HOD as chairman and two senior faculties as members.</p>	<p>1. The committee performs audit of lab course files i.e. verify the contents of the course file, lesson plan, extra material lecture notes, evaluation procedure etc.</p> <p>2. Moreover a safety audit is conducted by the PAC in addition to the conduct of laboratory experiments in proper and fruitful manner.</p>	<p>The parameters are assessed to ensure the teaching methods of benchmarked standards are being used throughout the institute. Feedback is communicated to the concerned faculty member.</p>	<p>Each faculty member is encouraged to undergo at least one FDP per year. The FDP is mainly focussed to improve the communication skills and to train the faculty in improvised methods of techniques of analysis and to get exposure to new tools. The FDPs are carried out at the institute level itself by the learning and development team mainly sponsored under TEQIP-III.</p>

(c) Academic Audit Report through Internal Quality Audit Cell.

In addition to the above exercise an academic audit by the IQAC of the department was initiated from the year 2017 onwards. However in 2018, an audit was conducted through the following faculty members.

Auditors Name:

1. Prof. M. F. Wani
Professor, Department of Mechanical Engg., N.I.T Srinagar.
2. Prof. Abdul Liman
Professor, Department of Mathematics, NIT Srinagar

Date of Audit: 13-03-2018

<i>Proposed</i>	<i>Action</i>
<ul style="list-style-type: none"> ○ Purchasing of departmental sophisticated instruments and other consumables and non consumable items. 	Several numbers of instruments, consumable and non consumables Items have been purchased as mentioned in the budgetary details
<ul style="list-style-type: none"> ○ The trend started by department faculty members of publishing research papers in reputed journals like Elsevier, ACS, Taylor-Francis, Springer should be encouraged amongst PhD and M. Tech students. 	The trend has been taken initiated as suggested and for details of published papers given in criteria 5.
<ul style="list-style-type: none"> ○ The department should initiate interaction with industries present in J&K as well as other parts of the country in form of lectures from industrial personnel, academia-industry interaction sessions/workshops. 	The department has initiated conducting workshop / STC's etc.
<ul style="list-style-type: none"> ○ Efforts should be made to Interact students with visiting faculties from eminent industries and academia. 	The suggestion has been widely implemented.
<ul style="list-style-type: none"> ○ Computational facilities of the department should further be augmented with addition of high end CAD modelling facilities etc. ANSYS WORKBANCH, AUTODESK INVENTOR etc. should be established. Moreover both undergrad and post graduate students should be given projects that would acquaint them with these software's, to increase their employability and motivate them to further research. 	Purchase of software is in pipeline (Tendered)
<ul style="list-style-type: none"> ○ Books in the central library regarding Mechanical Engineering should be increased. Further, the students may be issued six textbooks for the entire semester, three references and research books for maximum 15 days. Digitisation of library may be done on priority basis and linked to the department computers. 	Implemented as proposed/suggested.
<ul style="list-style-type: none"> ○ Subscription to Mechanical engineering 	Implemented as suggested

journals should be increased for benefit of research students and faculty.	
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Budgetary details of Mechanical Engineering Department for the years 2017-2018, 2018-2019 and 2019-2020.

S. No.	Name of the Equipment	Name of the Lab.	Date of Procurement	Cost (INR)
1.	Thermal conductivity of insulating powder	Heat transfer Lab.	01-07-2017	36,878
2.	Heat pipe demonstrator	Heat transfer Lab.	01-07-2017	36,878
3.	Heat transfer through a composite wall	Heat transfer Lab.	01-07-2017	36,878
4.	Heat transfer through a metal rod.	Heat transfer Lab.	01-07-2017	36,878
5.	Heat transfer in forced convection	Heat transfer Lab.	01-07-2017	40,253
6.	Heat transfer in natural convection	Heat transfer Lab.	01-07-2017	36,878
7.	Shell and tube heat exchanger	Heat transfer Lab.	01-07-2017	74,003
8.	Pump set with Rotor including Starter and Accessories	CAD Lab.	09-08-2017	12,75,000
9.	Minimum Quantity Lubrication system.	Tribology lab.	13-10-2017	1,78,250
10.	Portable surface roughness tester.	Tribology lab.	13-10-2017	1,88,220
11.	Digital portable hardness tester.	Tribology lab.	13-10-2017	77,553
12.	Digital Oscillator.	Mechatronics Lab.	09-11-2017	98,550
13.	Pressure Transmitter.	Turbine Erosion Testing Lab.	08-01-2018	29,355
14.	RPM Meter with Display and Transmitter.	Turbine Erosion Testing Lab.	08-01-2018	1,24,630
15.	Magnetic Flow meter.	Turbine Erosion Testing Lab.	08-01-2018	1,84,370
16.	Vibration Sensor Transmitter.	Turbine Erosion Testing	08-01-2018	1,55,530

		Lab.		
17.	PLC Panel.	Turbine Erosion Testing Lab.	08-01-2018	4,63,500
18.	Experimental Test Rig for performance test with S1 loading arrangement. (3-cylinder, 4-stroke petrol engine test set up computer based.)	I.C engine Lab.	08-11-2017	9,67,680
19.	Experimental Test Rig for performance test with mechanical CI loading arrangement. (Single cylinder 4-stroke variable compression ratio Diesel engine test set up computer based).	I.C engine lab.	08-11-2017	8,37,800
20.	Slurry erosive Wear tester	Dynamics Lab.	17-05-2017	7,49,250
21.	Fatigue Testing Machine (LFV Type) [-150 to 600°C) Impact Tester	Advanced strength materials lab	30-11-2017	1,92,63,546
22.	UTM (-70 to 1000°C operating temp)	Advanced strength materials lab	31-03-18	99,12,652
23.	Torsion tester	Advanced strength materials lab	12-04-18	46,86,946
24.	Brinell/Rockwell Hardness Tester	Advanced strength materials lab	31-03-2018	7,97,778
25.	Micro Vicker Hardness Tester	Advanced strength materials	31-03-2018	13,96,112
26.	Video Gauge	Advanced strength materials	25-09-2017	51,02,599
27.	Plastic tub , Hygrometer, Voltmeter, Rotometer, Screw Driver, Apron, Gloves, Vernier Caliper, Sisor	Heat Transfer Lab	02-01-2018	10,821

28.	5x Embedded Brake Pad, Thermocouple Temperature Sensor	Heat Transfer Lab	02-01-2018	9,624.60
29.	Silt Particles	Corrosion Testing Lab	15-01-2018	14,910
30.	Nano Tribometer Holder 2mm	Tribology Lab	29-01-2018	14,828
31.	Acetone-5L, Ethanol-500ml, Tissue paper, Rubber Gloves, Mask	Tribology Lab	29-01-2018	14,680
32.	Ti3 SiC Powder	Tribology Lab	29-01-2018	14,435
33.	Ti3 SiC Powder	Tribology Lab	29-01-2018	14,918
34.	MoS2 Powder-5gm, Petri Dish, Beaker-250ml, Rubber Gloves	Tribology Lab	29-01-2018	14,970
35.	SiC Grade1200 paper 10 No. SiC Grade1600 paper 12No. SiC Grade2000 paper 12No.	Tribology Lab	15-02-2018	10,500
36.	Zirconium, Oxochloride, Sad Tungstrate, Hydrogen Chloride, Hydrogen Peroxide, Double Distillation Water, PVA Watman Filter Paper, Glyclradehyde	Corrosion Testing Lab	31-01-2018	14,997
37.	Filter Paper, VIAL- small	Corrosion Testing Lab	27-02-2018	14,984
38.	Ultra Sonic Probe Sonicator	Tribology Lab	21-02-2018	95,108
39.	Silicon Carbide Balls 8 No. 9.6 diameter	Tribology Lab	08-03-2018	97,232
40.	MoS2+5% al Ti Target MoS2+10% al Ti Target	Tribology Lab	21-02-2018	94,202

41.	Acetone, Tissue Roll, Velvet Cloth, Aluminium Discs, Aluminium Discs Polished, Ethanol-500ml, MoS ₂ , Gloves, Culture tube with cap, Embry Paper	Tribology Lab	08-03-2018	98,038
42.	Silt Particles of Chanani powder, transportation and collecting	Corrosion Testing Lab	13-03-2018	14,800
43.	Petrol, Plastic Container-50L, Ethanol, Diesel, Mineral Oil	IC Engine Lab	24-04-2018	14,500
44.	Magnetic Stirrer	Heat Transfer Lab	18-05-2018	14,999
45.	Goat Wool Insulation, Horse hair sample, Aluminium foil, M seal	Heat Transfer Lab	14-06-2018	9,490
46.	Graphite Oxide MoS ₂ , Graphene 10g each	Tribology Lab	05-07-2018	19,990
47.	Hollow Cylinder Block	Heat Transfer Lab	04-09-2018	7000
48.	Cartidge Heaters 14N0.	Heat Transfer Lab	04-09-2018	6,860
49.	ZBB2 Nano Powder Graphite nano flakes, Multi walled Carbon nanotubes Graphene nano platelets 25g each	Tribology Lab.	06-09-2018	99,902
50.	EN 31 Steel 30mm Silicon carbide paper, Arosol spray, Diamond paste	Tribology Lab.	12-09-2018	24,957
51.	H.P.Laser Jet M1005	Tribology Lab.	20-09-2018	35,600
52.	H.P.Laser Jet Cartridge, Drum	Tribology Lab.	25-09-2018	1,050
53.	2'x2' Height 3' having two doors with glass all sides	IC Engine Lab	26-09-2018	14,700

54.	ASTM Standard test balls 230 N0.	Tribology Lab	24-10-2018	19,812
55.	Sound Level Meter Sound Level Calibrator	Tribology Lab	1-11-2018	97,119.32
56.	Oil Filters' Ball valve- 25mm, steel tube nipple, elbow, union, mechanic charger, single cylinder diesel engine	Mechatronics Lab	13-11-2018	3,835
57.	Air Compressor AC-24L, 25HP,220V	Heat Transfer Lab	13-11-2018	12,508
58.	Acryl Sheet 1N0.	Heat Transfer Lab	13-11-2018	6,840
59.	118754 DC Motor Mean well SMP NES DC Power supply LMDC DC Motor Driver	Mechatronics Lab	29-11-2018	24,900
60.	Ultra Sonic bath Sonicator	IC Engine Lab	06-12-2018	13,570
61.	Hazel nut oil, Avocado oil	Tribology Lab	11-12-2018	10,941
62.	UHMWP	Mechatronics Lab	20-12-2018	14,950
63.	Non edible vegetable oil, Engine oil	Tribology Lab	31-12-2018	4,956
64.	Single cylinder inlet mono flow	IC Engine Lab	01-01-2019	8,499
65.	Zirconium nitrate	Tribology Lab	03-01-2019	24,995
66.	EPSON L565 Printer	Tribology Lab	16-01-2019	15,700
67.	Desiccator	Heat Transfer Lab	22-01-2019	13,500

68.	Titanium Dioxide	Tribology Lab	22-01-2019	24,638
69.	Beaker-250ml Beaker-500ml Test tube stand, Tissue paper, Dropper, Syringe, Ethanol, Methanol, Toulvene-1L each Acetone 5L Test tube stand 100ml, Gloves Cotton 500g	Tribology Lab	22-01-2019	14,415
70.	24 Inch length, 2.5 inch diameter Diamond copper inserts, CNMG-120408(TIAIN) CNMG-120408 Tungsten carbide Tool holder	Mechatronics Lab	28-01-2019	98,910
71.	Hot Air Oven with Digital PID Controller	Mechatronics Lab	31-01-2019	69,185.70
72.	ASTM Standard test balls 12.7mm dia.	Tribology Lab	01-03-2019	8,614
73.	Konica Minolta Tonner Cartridge	Mechatronics Lab	11-03-2019	7,850
74.	Fluke made Digital Multimeter Model Fluke-106 -107 1No. Each	Mechatronics Lab	28-03-2019	9,130
75.	Nitrogen gas cylinder Genuine oil Vial 5ml	Tribology Lab	29-03-2019	19,495
76.	Claw Hammer-802 Plier Miniature, 6inch basic long nose 5No. 140mm soft grip diameter file set Stanley Miniature diagonal cutting plier Stanley Hacksaw, Stanley long nose plier 6inch Stanley steel combination	Mechatronics Lab	22-03-2019	24,901

	<p>6inch plier Stanley precision screw driver set Stanley hack key set 10-pieces Crimping plier Steel punch and chisel set Nail Hammer Double open end spanner set Wire stripper Offset ring spanner set Wire stripper with cutting edge 6pieces cushion grip 2 screw set S2 precision screw driver set 9way screw driver set Adjustable Wrench, Battery powered screw driver Screw driver tool kit, Taparia plastic tool box, magnifying lens, diagonal cutting plier</p>			
77.	<p>Wollastonite(CaSiO₃) Brake pressure guage Disc Pedals Brake,plier,heating element, copper disc, brass disc Duracell battery</p>	Heat Transfer Lab	25-04-2019	17,256
78.	<p>Photo electric Car model Stepper motor NEM23 DC Servo Motor 24v 100w Metal gear standard Analog Alligator Crocodile Alligator clips</p>	Mechatronics Lab	03-04-2019	24,908
79.	<p>16Amp Extension Cord 6No.</p>	Mechatronics Lab	08-05-2019	4,650

80.	Nylon 90GSM 1NO. PP/Half Fabric 15kg	Corrosion Testing Lab	05-05-2019	5,439
81.	Acoustics Module single user CPU Locked licence CAD import module single user locked licence	Heat Transfer Lab	13-05-2019	1, 15640
82.	Titanium di Boride 100g	Tribology Lab	11-06-2019	24,638
83.	Toluene 500ml Zinc stearate	Tribology Lab	09-04-2019	1,233
84.	SS316 Solid cylinder rod 2feet long, 100mmdia.	Tribology Lab	23-07-2019	18,925
85.	ASTM Standard Test balls Dia. 12.7mm	Tribology Lab	11-07-2019	8,614
86.	1.75mmPrinting filament 1.75mm Printing SD filament 1.75mm Printing3D filament 2.5mm pitch PCB header	Mechatronics Lab	04-07-2019	24,900
87.	Test tube 10ml 5No. Test tube 20ml 5No. Cylinder 50ml 2No. Cylinder 100ml 2No. Micro pipette, spatula, test tube holder	Heat Transfer Lab	09-04-2019	9,505
88.	Godrej Interior 4 Door Book Laze 4No.	Mechatronics Lab	30-07-2019	1, 53,000
89.	HP Laser jet 12A Toner Cartridge Block	Production Lab	30-07-2019	3,650
90.	Platinum Catalyst sheet Platinum ruthenium catalyst sheet Vulcan- Carbon sheet for MEA Coating spray	Mechatronics Lab	31-05-2019	2, 49,997
91.	Steel test balls Dia. 12.7mm 26No.	Tribology Lab	27-11-2019	2,761

92.	Xerox WC 3225 Phaser MFD	Mechatronics Lab	31-07-2019	21,840
93.	3D847A/040015DOSS-8600	Mechatronics Lab	31-07-2019	76,960
94.	First aid kit White board 20No. White board duster 20No. White board marker 10set	Production Lab	14-10-2019	32,600
95.	Turbine erosion testing rig	Corrosion Testing Lab	24-12-2019	25,96,000
96.	Noise test chamber	Tribology Lab	22-04-2019	2, 48,390
97.	Engine tribotester with tribo corrosion	Tribology Lab	21-06-2019	74,91,564
98.	5 Mega pixel blue light 3D scanner		03-01-2019	69,95,750
99.	Novint falcon haptic device	Mechatronics Lab	21-03-2019	99,900
100.	Ultra sonicator	Heat Transfer Lab	15-10-2020	1,80,780
101.	Experimental steam turbine test rig	Heat Transfer Lab	15-10-2020	9,19,569
102.	Dual scope FMP 40 (coating thickness gauge)	Corrosion Testing Lab	20-03-2021	5,00000
103.	15 KVA single phase generator set	Mechanics Lab	27-03-2021	3,19,200
104.	Thermal conductivity apparatus	Heat Transfer Lab	15-10-2020	6,42,780
105.	Parallel flow heat exchanger	Heat Transfer Lab	1-02-2021	30,300

106.	Drag coefficient apparatus	Fluid Lab	09-02-2021	42,900
107.	Reynolds apparatus	Fluid Lab	09-02-2021	24,900
108.	Dead weight pressure gauge tester	Fluid Lab	09-02-2021	51,900
109.	Heat transfer through metal rod	Heat Transfer Lab	1-02-2021	24,900
110.	Heat transfer through forced convection	Heat Transfer Lab	1-02-2021	24,900
111.	APC 150 KVA U.P.S with 40 batteries	Mechanics Lab	17-03-2021	4,94,263
112.	Erection of refurbishment of Pelton turbine	Corrosion Testing Lab	26-03-2021	1,03,840
113.	Renewal of TECS/AMC for ANSYS+ANSYS academic teaching Machines, 5 tasks each +Purchase of ANSYS academic H.P.C 1 task-128 code with four years of TECS/AMC		25-03-2021	27,04,800
114.	Abacus software 05 user licenses		20-03-2021	10,50,000
115.	Single power supply (2 no.) 5v2A multiphase D.C power supply (4 no.), D.C power supply(1 no.), power supply 30A30V (2 no.), D.C supply 0.3V 3A (1 no.), Function generator	Mechatronics Lab	19-03-2019	2,27850
116.	Lego Ministorm EV3-core set 45544 (5 no.)+ Lego transformer, IOV D.C 45517	Mechatronics Lab	8-04-2019	2,36000
117.	Wind tunnel	Fluid Lab	09-02-2021	2,31,900

118.	Sony VPLSW 631C Projector 3100, 1M WXGA, LAN, USB type, 16W 5 PCR		30-04-2019	1,03,500
119.	EMG Octopus 4CH with A.C Batch WGETST0067		18-02-2021	3,60000
<input type="checkbox"/> Consumable Items		<input type="checkbox"/> Maintenance materials		<input type="checkbox"/> Software's

7.3 Improvement in Placement and Higher Studies

(09)

S.No.	Year	Total students	Total placements	Core industry placements	Percentage	Pay packages (lacs)
1.	2017-2018	75	27	13	36	3 to 12
2.	2018-2019	72	32	05	44.4	3.75 to 8
3.	2019-2020	58	19	06	33	4.65 to 18

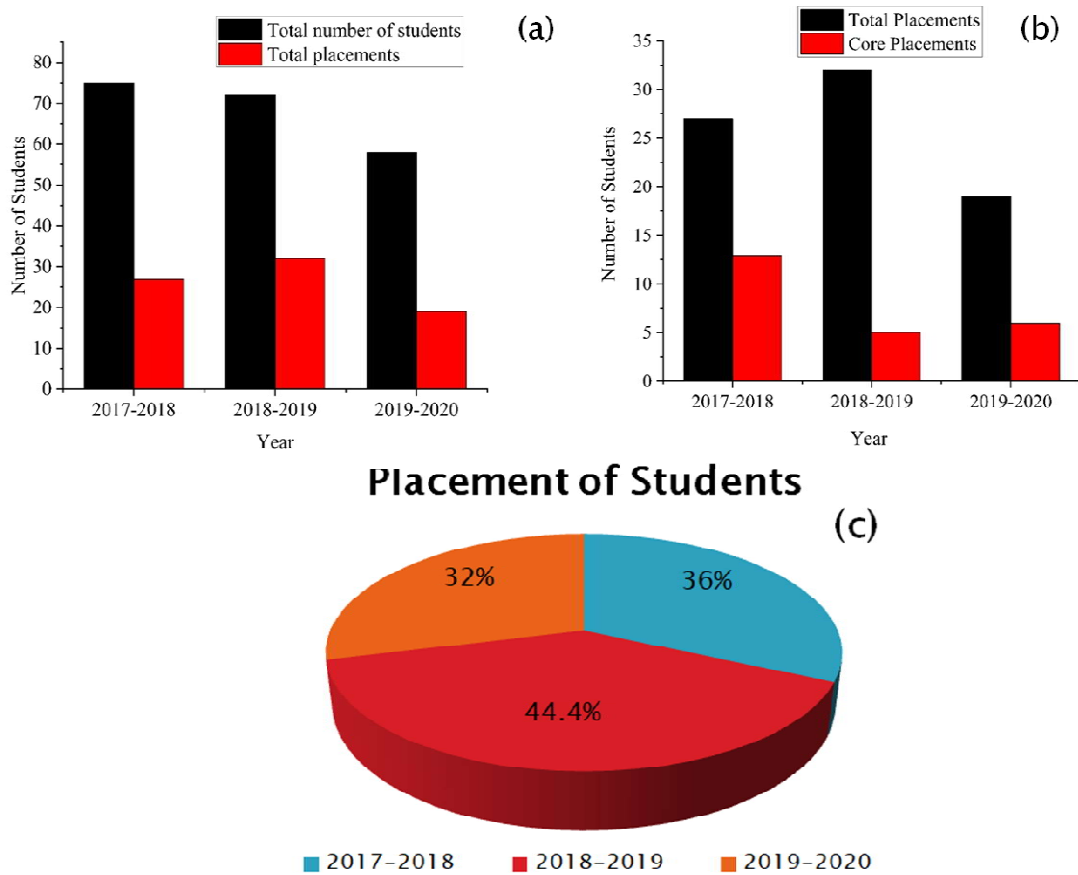


Figure 1. (a) Total number of student admitted to the program vs. number of student placed in the assessment years; (b) Total placement vs. Core industry placement; and (c) Percentage of Placed students in all the three assessment years.

Higher Studies & Entrepreneurs:

Particular	CAYm1 2019-20	CAYm2 2018-19	CAYm3 2017-18
Total No. of Final Year Students (N)	58	72	75
No. of students placed in companies or Government Sector (x)	19	32	27
No. of students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level Tests, GRE, GMAT etc.) (y)	05	10	04

No. of students turned entrepreneur in engineering/technology (z)	00	00	01
$x + y + z =$	24	42	32
Placement Index: $(x + y + z)/N$	0.44	0.583	0.426
Average placement= $(P1 + P2 + P3)/3$	0.483		
Assessment Points = $30 \times$ average placement	14.49		

Note: Although the number of students placed has decreased, but the number of students actually placed in core companies has increased. It is observed that placement data is slightly unpromising for CAY 2019-2020. This can be attributed to the unfortunate COVID-19 pandemic in Spring 2020, that negatively affected the placement drives as well as job market. However, this was compensated with a larger percentage of students opting for higher studies.

7.4 Improvement in the quality of students admitted to the program (19)

Student quality is assessed through the opening and closing ranks in JEE Mains, of students admitted into the undergraduate program of Mechanical Engineering Department.

Particular		CAY (2019-20)	CAYm1(2018-2019)	CAYm2(2017-2018)
National Level Entrance Examination (JEE)	No. of Students admitted	87	83	78
	Opening Score/Rank (MECHANICAL ENGINEERING)	1845	1927	1347
	Closing Score/Rank (MECHANICAL ENGINEERING)	311998	277745	183978

Year	Total number of students	Students with distinction	Percentage improvement
2017-2018	78	66	84%

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2018-2019	83	62	74%
2019-2020	87	78	89%