

Innovations by faculty in Teaching and Learning

Clear goals and adequate preparation:

The goals of innovative practices in the teaching-learning process are to make the students get insight knowledge, skill sets and, in the course, and obtain good grades in the End Semester examinations.

To achieve this faculty members are consistently taking the following measures:

- **Attending Faculty Development Programme**
- **Delivering lectures in Value Added Courses**
- **Undergoing industrial training and Implant training**
- **Undergoing Advanced Training Programme**
- **Self-equipping through Institute – Industry Interaction**
- **Pursuing online courses**

This enables the faculty members to get adequate preparation with subject knowledge to achieve the goal in the teaching-learning process.

Appropriate Methods, Effective Presentation, Reflective Critiques

The Teaching and Learning methods are very much essential for the Mechanical Engineering students to visualize most of their core concepts like Heat Transfer, Finite element Methods, Robotics & applications, Theory of Machines and Fluid Mechanics. The importance of these subjects can be easily understood by looking at any of the question papers of competitive exam like GATE. Many students will find it difficult to understand the concepts of this subject because of the nature of the subject. It requires the students to visualize the each and every topic in three dimensional. The students also find it difficult to do calculations involved in the subject since most of the quantities are vector. Hence to create interest among students and to make the subject comfortable for them to learn, various innovative practices were adopted in the teaching-learning process.

The list of innovative practices followed in teaching-learning processes is listed below.

S. No.	Innovations by the Faculty in Teaching and Learning
1	Learning with technology involving creation of YouTube channel
2	Learning with Course Certifications (NPTEL, Coursera, &Udemy)
3	Learning by Research Paper
4	Learning by Industrial Visit
5	Teaching through Collaboration(Group discussions, Group Projects)
6	Teaching through Role Play
7	Teaching through Technology (Mind Map tools, etc.)
8	Demonstration of Project through Animated Video and handmade Poster
9	Teaching through Flipping Classroom
10	Teaching through Alumni Interaction
11	Teaching through Virtual Labs
12	Student Seminars
13	Blended Learning

S. No.	Innovations by the Faculty in Teaching and Learning
14	Virtual Teaching - Learning Management System (LMS) (Google Class Room, Microsoft Teams)
15	Project Based Learning
16	Social Responsibility
17	Teaching through Animations and Presentations
18	Learning by Technology (Blogs, Online Test Tools-Moodle)
19	Digital Library

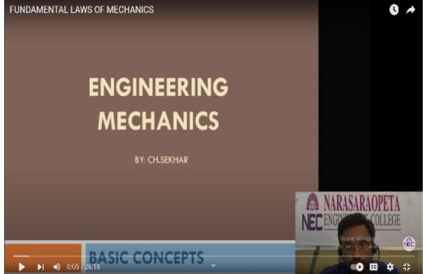
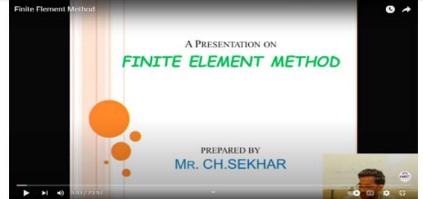


Innovative Teaching Methods	Methods /Tools used	The Objective of the Innovation		
Learning by Technology	Google Blogs	<p>Few faculty members have also created their own blogs wherein they upload study material relevant to their subjects. The links are shared with the students and the contents are openly accessed by all students</p>		
		Name of the Faculty	Google sites URL	Subjects available in sites
		Dr. B. Venkata Siva	https://drvenkatasiva.blogspot.com/	Robotics
		Dr. D. Jagadish	https://djagadish.blogspot.com/	Thermodynamics
		Dr. M. Rama Kotaiah	https://drmmramakotaiah.blogspot.com/	Design
		Dr. B. Ravi Naik	https://drravinaikb.blogspot.com/	CAD/CAM
		T. V. Rao	https://tvraonec.blogspot.com/	Python Basics
		P.Srinivasa Rao	https://srinivasarao1970.blogspot.com/	R&AC
		P. Sravani	https://psravaninec.blogspot.com/	Production Planning & Control
		K. John Babu	https://kandrujohnbabu.blogspot.com/	Operations Research
		A.Pavan Kumar	https://arigelapavankumar123.blogspot.com/	Manufacturing Sciences
		D.Raghavendra	https://raghavendra328.blogspot.com/	Design of Machines
		Dr. T. Raja Santosh Kumar	https://drtrajasantoshk.blogspot.com/	Kinematics of Machines
		Shaik Nagul Meeravali	https://nagulmeeravali.blogspot.com/	Thermal Engineering
		Dr. M. Naveen Kumar	https://drmnaveenkumar.blogspot.com/	Automobile Engineering
		M. Venkaiah	https://venkatmandulanec.blogspot.com/	Material Science & Metallurgy
		Dr. M. Venkanna Babu	https://drvenkannababu.blogspot.com/	Dynamics of Machinery
		Ch.Sekhar	https://sekharchinthamreddy.blogspot.com/	FEM
		Dr. P. Suresh Babu	https://drpsureshbabu.blogspot.com/	Metrology
		G.Bhargav	https://gbharagav.blogspot.com/	DME
R.Chinna Rao	https://rchinnar.blogspot.com/	CAD/CAM		
T.Devarajulu reddy	https://tdevnaga.blogspot.com/	Power Plant Engineering		
P.Kiran Kumar	https://pkiranp.blogspot.com/	Automotive Vehicles		
MD.Taju	https://mtajud.blogspot.com/	R&AC		
N.Arun kumar	https://narunk.blogspot.com/	DOM		

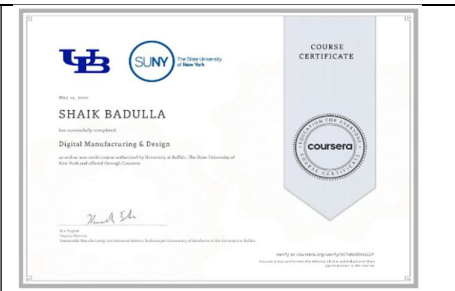

		K.Govardhan Reddy	https://kreddygovardan.blogspot.com/	AMP
		B. Ajay Kumar	https://bkumarajay.blogspot.com/	FEM
		T.Narendar	https://tnarendert.blogspot.com/	AMP
		K. Jailsing	https://jailsingk.blogspot.com/	Applied thermodynamics
		TNV Mahesh babu	https://tnvmaheshbabu.blogspot.com/	Industrial Engineering
Virtual Teaching	Google Classroom	<p>Creating a Google classroom using Google app. Students are made to join as members of the Google classroom. Lecture materials, Assignments, Quiz questions are posted in the online classroom.</p> <p>Many faculty members are using Google Classroom for organizing and managing online classes.</p>		
	Microsoft Teams	<p>An online class is a course conducted over the Internet. They are generally conducted through a learning management system, in which students can view their course syllabus and academic progress, as well as communicate with fellow students and their course faculty. These classes can be recorded for future reference.</p>		
	Virtual Labs	<p>Virtual Labs are included in the course syllabus.</p> <p>This practice provides a complete Learning Management System for Virtual Labs where the students can avail various tools for learning, including additional web-resources, video-lectures, animated demonstrations, and self-evaluation.</p>		
Information and Communication Technologies (ICT) Enabled Teaching-Learning	LCD projector	<p>Objectives:</p> <p>To provide direct access to quality instructional resources through computers connected in LAN and Internet. Motivate the students to do electronic presentations (PPT).</p> <p>Facilities:</p> <p>Every classroom is provided with an LCD projector, computer with LAN and internet connection. The faculty member can use a blackboard / LCD projector judiciously during the lecture delivery. The faculty member can access the database of the digital library from the classroom which consists of course material, recorded video lectures, and animations.</p> <p>Outcome:</p> <p>The students and faculty members are engaged in an effective teaching and learning process through the use of digital learning platforms.</p>		





	Power Point Presentations	<p>This has become a standard norm in the teaching-learning process. Power point presentations are very effective in Communication Skill Development, Improving verbal skills for effective public speaking and Sharing of Knowledge by communicating in regular interactions.</p> <p>Student Seminars:</p> <p>Seminar from the first semester onwards which is being practiced students to enhance oral expression and presentation skills. This significantly boosts students' confidence and their learning experience.</p> <p>Seminars are a vital part of academic programs that allow developing essential skills and understanding of the subject.</p>
MOOCs	<p>Massive Open Online Courses (MOOC)</p> <p>NPTEL, Coursera</p>	<p>Faculty members are motivated to students to take up online courses for their subjects from various eminent platforms like NPTEL, Coursera.</p> <p>NPTEL:</p> <p>The main objective of the National Program on Technology Enhanced Learning (NPTEL) is to enhance the quality of engineering and science education in the country by developing content for undergraduate and postgraduate curricula using video and web-based courses. These courses cover the syllabi prescribed by universities and approved by AICTE.</p> <p>NPTEL Local Chapter:</p> <p>Our college is having NPTEL Local Chapter: It is a partnership between the college and NPTEL. Many students and faculty members in the department enroll for courses and get certified after the successful completion of the course.</p> <p>Coursera:</p> <p>Many faculty members and students in the department have completed online courses based upon their area of interest. These courses also help the faculty to advance their skills for career development.</p> <p>https://www.coursera.org/</p>
Alumni Interaction	Technical Talk	Alumni students are invited for a technical talk and interact with the students. It is arranged in each semester for the students to know the current industry needs.
Project Based Learning	Project work and	The department has made it a mandatory requirement for every student to design and conduct a project, right from the fifth semester onwards which is beyond the regular curriculum for the semester. This helps

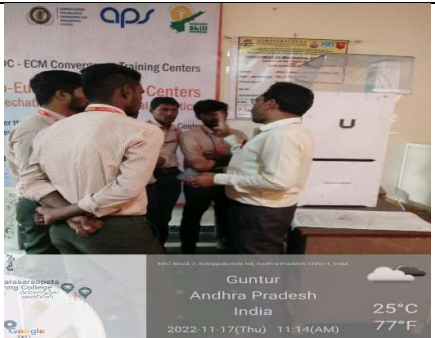


	<p>Report writing</p>	<p>the student to have a hands-on approach to the engineering design process and utilize the theoretical aspects they have learnt to develop prototypes and design experiments on what they have learnt.</p> <ul style="list-style-type: none"> • The students conduct a mini-project that focuses on the fundamental Design & Fabrication aspects of Mechanical Engineering. A project group consisting of a maximum of four members under the guidance of a faculty member explores a scientific principle related to their area of interest. The learning process is given more weightage during the assessment and not the results obtained. • Students in their eight semester are encouraged to do a project which will help them to learn new technical skills with guidance from an allotted faculty member. They are encouraged to explore a problem and develop a simple prototype or working model that can solve it. This introduces them to the concept of the Engineering design process method. • The group of students is also mentored by their allotted guides in preparing a well-structured report. To assist this process, the institution has published a scientific format in which each project group is required to submit the report. This practice helps the students to understand and improve their scientific writing skills. The prepared report is archived in both soft and hard copy and is made available in the department library for peer reference.
<p>Activity Based Teaching</p>	<p>Collaborative Learning</p>	<p>It involves encouraging student collaboration for various projects. We live in a globalized world and collaboration is an essential life skill that is important for all careers and enterprises. Teachers can help foster this skill in the classroom by allowing students to learn, study and work in groups.</p>
	<p>Flipped Class Room</p>	<p>It involves encouraging student for presentation of different concepts from the syllabus as a part of revision. Flipping the classroom is an effective teaching method. In this technique, the students are made active participants of the learning process by passing the onus of learning on them, it requires the teachers to relegate to the role of resource providers and the students take the responsibility of gathering concepts information. Using various tools of technology the students are encouraged to constructing knowledge, fill in the information gaps and make inferences on their own as and when needed</p>
	<p>Group discussions</p>	<p>To make students develop communication skills.</p>
	<p>Seminars</p>	<p>To make students develop communication skills and reduce the stage fear in them.</p>
	<p>Blended Learning</p>	<p>Blended learning is an approach that combines the usage of online educational materials and facilities for interaction with physical place-based classroom methods.</p>
	<p>Social Responsibility</p>	<p>To inculcate the social responsibility by participating students in NSS programmes</p>
	<p>Role Pay</p>	<p>The results reveal that participants are more enthusiastic to engage in class activities. They also develop social and communication skills through group activities associated with the teaching of ADA. Role play can be a very useful strategy to teach concepts that are perceived as abstract.</p>



	Learning by Doing	It is a hands-on approach to learning, meaning students must interact with their environment in order to adapt and learn.
Audio-Visual Aids	YouTube videos	The video lectures of specific topics in selected courses were prepared by the course faculty and had the same content as the classroom lectures. Video lectures give students control of the lecture and are portable. Students can replay segments and stop the lecture as they study to understand the content. They can skip segments of topics they know. In effect, they can adjust the instructors delivery speed and topic selection to match their learning pace, especially beneficial to the weak students.
	Digital Library	Faculty and Students can access the class presentations, previous question papers, course Materials and journal resources also from the Digital Library.

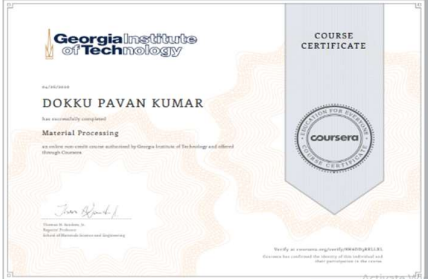
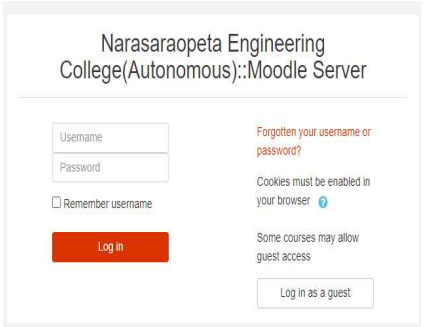

Course Title/Activity	Type of Innovation in Teaching & Learning Method	The Objective of the Innovation	Significant Results Observed	Template/Photo/Certificate
Engineering Mechanics (Teacher: Ch. Sekhar)	Learning with technology involving creation of YouTube channel	YouTube channels has become one of the teaching tools for teachers all around the world and are adding to their arsenal. The channels make it easier and more convenient for teachers to pass knowledge to students in ways that were never possible in the past. With video lectures it encourages a level of familiarity that helps with building a community and knowledge that is always available and accessible, irrespective of teacher's and student's location	The students were able to attend lecture at any place and at any time. Also they would explore and learn from more lectures available for all the new technologies and frameworks.	
Finite Element Methods (Teacher: Ch.Sekhar)				
Heat Treatment of alloys (Teacher: Dr.P.Suresh Babu)				
Heat Transfer	Learning Through Collaboration	It involves encouraging student collaboration for various projects. We live in a globalized world and collaboration is an essential life skill that is important for all careers and enterprises. Teachers can help foster this skill in the classroom by allowing students to learn, study and work in groups.	Gives students ownership over the learning process <ul style="list-style-type: none"> Increases student motivation to learn Allows students to develop useful skills in self- and peer-assessment. 	




<p>Digital Manufacturing & Design</p>	<p>Learning with Course Certifications (Coursera)</p>	<p>Students follow the courses with help of video lectures and are being tested with help of quizzes at the end of all chapters in the course and at the end certificates are earned by them on successfully completing the course.</p>	<p>It gives students confidence that they have learned and passed their test. This experience gives exposure to ideas and approaches outside their comfort zone. In addition, they are being able to think outside their experience which is an ingredient of leadership.</p>																														
<p>Introduction to thermodynamics</p>																																	
<p>Preparation for Competitive Exams/Core Exams</p>	<p>Department Library & Digital Library</p>	<p>In order to overcome the gap between the theoretical knowledge and Practical knowledge, The Digital Library is very helpful for Faculty and Students can access the class presentations, previous question papers, course Materials and E-journal.</p>	<p>The students were very involved and learned students to have self-learning beyond curriculum through the facilities available in the Learning resource centre such as National Programme on Technology Enhanced Learning (NPTEL) Video Lectures and E-journals.</p>	<table border="1"> <thead> <tr> <th>S. No.</th> <th>Name of the Journal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>International Journal of Mechanics and Design</td> </tr> <tr> <td>2</td> <td>Journal of Mechatronics & Automation</td> </tr> <tr> <td>3</td> <td>Journal of the institution of Engineers- SERIES C</td> </tr> <tr> <td>4</td> <td>Journal of Advancements in Material Engineering</td> </tr> <tr> <td>5</td> <td>Journal of Manufacturing Engineering</td> </tr> <tr> <td>6</td> <td>Indian Foundry Journal</td> </tr> </tbody> </table>	S. No.	Name of the Journal	1	International Journal of Mechanics and Design	2	Journal of Mechatronics & Automation	3	Journal of the institution of Engineers- SERIES C	4	Journal of Advancements in Material Engineering	5	Journal of Manufacturing Engineering	6	Indian Foundry Journal	<table border="1"> <thead> <tr> <th>S. No.</th> <th>Name of the Journal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>International Journal of Mechanics and Design</td> </tr> <tr> <td>2</td> <td>Journal of Mechatronics & Automation</td> </tr> <tr> <td>3</td> <td>Journal of the institution of Engineers- SERIES C</td> </tr> <tr> <td>4</td> <td>Journal of Advancements in Material Engineering</td> </tr> <tr> <td>5</td> <td>Journal of Manufacturing Engineering</td> </tr> <tr> <td>6</td> <td>Indian Foundry Journal</td> </tr> </tbody> </table>	S. No.	Name of the Journal	1	International Journal of Mechanics and Design	2	Journal of Mechatronics & Automation	3	Journal of the institution of Engineers- SERIES C	4	Journal of Advancements in Material Engineering	5	Journal of Manufacturing Engineering	6	Indian Foundry Journal
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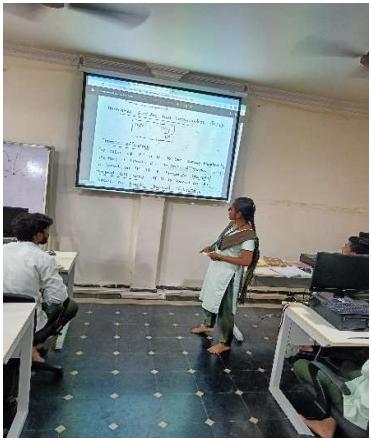

<p>Central Institute of Petrochemical Engineering and Technolgy 18th March 2023 (II Year students)</p>	<p>Learning by Industrial Visit</p>	<p>In order to overcome the gap between the theoretical knowledge and Practical knowledge, this teaching technique is very helpful. Students can understand how to implement their knowledge practically.</p>	<p>The students were very involved and learned how the industry works, what practices are followed there and how to prepare for working in IT field.</p>	
<p>Robotics & 3D Printing</p>	<p>Student Seminars</p>	<p>In many subjects, students deliver Seminars to the rest of their classmates. This significantly boosts students' confidence and their learning experience.</p> <p>Idea: To make students develop communication skills and reduce the stage fear in them.</p> <p>Implementation: Select topic</p> <p>Each student is assigned a topic, Students are asked to give an explanation on the concept</p>	<p>Bringing out the communication skills of students</p>	
<p>Python</p>				
<p>Design and Fabrication of Air Purifier Using Hepa Air Filter</p>	<p>Project Based Learning</p>	<p>Improve the Methodology to Integrate knowledge and skills</p>	<p>The students are involved to learn the things based on hands on experience</p>	



<p>Industrial Robotics & 3D Printing.</p>	<p>Learning by Doing</p>	<p>Student can learn the skills and apply in the laboratory in presence of the faculty</p>	<p>The students were very involved and learned how to work with industrial robotics and 3D Printing.</p>	
<p>Design of Machine Elements</p>	<p>Learning by Tutorial</p>	<p>Through the tutorials, students will learn how to solve the problems in engineering design</p>	<p>By the end of this tutorial, students will be able to apply problem solving principles to design the machine members</p>	
<p>Paper published in 2nd international conference on emerging trends in Mechanical & Industrial Automation (Student names: Y.Venkat Reddy, K.Praveen Reddy)</p>	<p>Learning by Research Paper</p>	<p>In order to encourage the students to get acquainted with reading and understanding research papers and technical terms given in quality literature and understand its implementation in emerging technologies and recent advancement. Also how to write quality content for International Journals.</p>	<p>The students developed their habit to refer classic papers from reputed journals and transactions. They developed their understanding over the recent advancement in the field; knew the peer community and got familiar with technical way of documentation.</p>	

<p>Power Plant Engineering (Student name: J. Nagendra Babu)</p>	<p>ICT Support Learning -NPTEL</p>	<p>ICT tools can be used to find, explore, analyze, exchange and present information responsibly and without discrimination. ICT can be employed to give users quick access to ideas and experiences from a wide range of people, communities and cultures.</p> <p>NPTEL- SWAYAM: SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. Largest online repository in the world of courses in engineering, basic sciences and selected humanities and social sciences subjects.</p> <p>Online facilities are provided to students for enrolling in various NPTEL courses. Faculty encourage the students to take get certified in NPTEL The faculty continuously guide the students and act as a mentor in solving NPTEL assignments. Students follow the course with help of video lectures and are being tested with help of quizzes at the end of all chapters in the course and at the end certificates are earned by them on successfully completing the course</p>	<p>Bringing out the expertise in technology with certification, programme skills, confidence of student that they have learned and passed their test. This experience gives exposure to ideas and approaches outside their comfort zone. In addition, they are being able to think outside their experience which is an ingredient of leadership.</p>	 <p>The certificate is awarded to JANGA NAGENDRA BABU for successfully completing the course Power Plant Engineering with a consolidated score of 61 %. Online Assignments 22.46/25 Proctored Exam 38.25/75 Total number of candidates certified in this course: 456 Date: Jul-Sep 2022 (8 week course)</p>
<p>Digital Manufacturing and Design (Student Name: Shaik Afride)</p>	<p>ICT Support Learning – Coursera</p>	<p>Coursera:Online facilities are provided to students for enrolling in various Coursera courses. Faculty encourage the students to take get certified in Coursera The faculty continuously guide the students and act as a mentor in solving Coursera assignments</p>	<p>Bringing out the expertise in technology with certification, programme skills, confidence of student that they have learned and passed their test. This experience gives exposure</p>	 <p>Shaik Afride has successfully completed Digital Manufacturing & Design The Coursera Certificate is awarded to the student by the University of New York at Buffalo, The State University of New York and Coursera Inc.</p>

<p>Material Processing (Student Name: D.Pavan Kumar)</p>		<p>Students follow the course with help of video lectures and are being tested with help of quizzes at the end of all chapters in the course and at the end certificates are earned by them on successfully completing the course</p>	<p>to ideas and approaches outside their comfort zone. In addition, they are being able to think outside their experience which is an ingredient of leadership.</p>	
<p>Course Materials for Subjects/Quiz</p>	<p>All Subjects</p>	<p>Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning</p> <p>Intranet http://192.168.158.162:8008</p> <p>Department of conducts online assessment tests using Moodle platform.</p>	<p>Active participation of students. Remembering the topic for a longer time.</p>	
<p>Heat Transfer</p>	<p>Group Discussions</p>	<p>To develop skills in interpersonal communication and in expressing views in a clear and concise manner</p> <p>Idea: To make students develop communication skills</p> <p>Implementation: Select topic</p> <p>Students are divided into groups.</p> <p>Each group is assigned a name based on topic selected.</p> <p>Students are asked to give their views on the concept</p>	<p>Bringing out the creative thoughts of students</p>	

NSS Programs	Social Responsibility	<p>Idea: To inculcate the social responsibility by participating students in NSS programmes</p> <p>Implementation: NSS Students are conducted many social activities like clean and green, Festival voluntary programmes, social Awareness Programmes etc.</p>	Bringing out the social responsibility by creative thoughts of students.	
Mini Project	Demonstration of Project through hands on experience	To visualize student's idea of project in a creative and interesting way so that it would help them to promote their product in an effective way in future. Also will help them to explore different directions of the project they are working on.	Students got better idea how to develop their project, what steps he must follow to achieve complete implementation.	
Applied Thermodynamics	Teaching through Flipping Classroom	It involves encouraging student for presentation of different concepts from the syllabus as a part of revision. Flipping the classroom is an effective teaching method. In this technique, the students are made active participants of the learning process by passing the bonus of learning on them, it requires the teachers to relegate to the role of	Teaching using this technique, responsibility is on the group of students are the educators play to the role of guides, mentors, supervisors for the students. It also teaches students empathy,	

		<p>resource providers and the students take the responsibility of gathering concepts information. Using various tools of technology the students are encouraged to constructing knowledge, fill in the information gaps and make inferences on their own as and when needed.</p>	<p>negotiation skills, teamwork, and problem-solving.</p>	
<p>Overseas opportunities for Core Branches</p> <p>(Name of Alumni: T.Akhil Sai, Ch.Gopi Babu 17 Batch)</p>	<p>Teaching through Alumni Interaction</p> <p>(for III & IV Year Students)</p>	<p>It involves sharing knowledge by alumni working in Core industry with their juniors on practical grounds. How to apply key skills in the design, development, maintenance, in industry is discussed.</p>	<p>Students can be trained on various aspects of the subject how they are used while developing a project is easily understood by the students.</p>	
<p>Mechanisms & Robotics Lab</p> <p>(Faculty: Dr.B.Venkata Siva)</p>		<p>It involves learning of theoretical concepts of Software Engineering with help of virtual environment so that students will get better understanding of subject. Using Virtual labs first concepts are explained to students and</p>	<p>Teaching using this technique makes teaching and learning interesting for students. They get involved in lessons so that they can</p>	

<p>Metal forming virtual simulation lab. (Faculty: Dr.D.Jagadish)</p>	<p>Teaching through Virtual Labs</p>	<p>then they are tested for their knowledge on the very same concepts.</p>	<p>answer the quizzes at the end.</p>	
<p>Strength of Materials Lab. (Faculty: Dr.D.Suneel)</p>				
<p>Machine Dynamics & Mechanical Vibrations Lab. (Faculty: Dr.M.Venkanna Babu)</p>				