DEPARTMENT OF MECHANICAL ENGINEERING

Innovations by the Faculty in Teaching and Learning

In order to enhance the learning abilities of the students and the teaching approach of the faculty members, following are the tools used:

1. Smart Class rooms
2. Working models
3. Employability Skill development
4. NPTEL based learning
5. Add on Courses
6. Encouragement towards projects with respect to student's interest

1. Smart Class Rooms:

The faculties use multimedia elements such as Tabs and LCD projectors in the class room. They also use all interactive modules like videos and presentations and these visually attractive methods of teaching become appealing to students as compared to the traditional method of teaching in a classroom. Additionally, all the instructional materials prepared by the faculty like PPT's, graphical representations are also dealt with in the Class room. Use of working mechanisms and models are also done.

Various multimedia tools used are:

Tools	Methods	Metaphor
Power Point Presentation of the topics to be delivered	Presentation of the material to be delivered by using popular multimedia techniques.	Slide based
Smart Class room	Teaching through various electronic media	Interactive based
Demonstration of videos and lectures	Easy to prepare and use of downloaded material	Web based

2. Working models

Prototyping serves to provide specifications for a real, working system rather than a theoretical one. Various physical models are used by the faculty to explain mechanisms. These tools are extensively used as it creates an interest on thought among the students.

Some of the mechanisms available in the department are :

i. Gears and gear trains

ii. Belt and chain drives

iii. Cam and followers

iv. Linkage

v. Friction devices, such as brakes and clutches

vi. Structural components such as a frame, fasteners, bearings, springs,

vii. Different types of boilers

viii. 3-D objects and cut sections of various models used in graphics.

3. Employability Skill development

Students are encouraged to undertake training classes in mechanical related software and other allied courses in order to enhance the employability skills of the students. The students are also encouraged to undertake industrial tours, internships and workshops in various industries in order to enhance the teaching and learning process.

Sl. No	Description	Impact
1	Hands on training on Non Destructive Testing.	34 students are placed as of now in various companies.
2	Training on various technical softwares as add on courses in order to enhance employability	512 students are trained in various technical softwares
3	Internships and industrial trainings in various organisations	----------

4. NPTEL based learning

NPTEL based online courses are attended by the faculty for enhancing their teaching skills and smooth conduct of the teaching process in the regular class room teaching. Interested faculties are supported to register for the NPTEL program/subject online certification course of their own areas of teaching and research interests. Similarly, students are supported with NPTEL video lectures in the central digital library and a data bank of the CD's of all the NPTEL courses are made available in the department library. Additionally, interested students are also encouraged to register for NPTEL certification courses for understanding the potential concepts much effectively.

Sl. No	Description	Impact
1	Use of NPTEL videos during regular class work interactions	Another way of delivering learning material differently
2	Online certification courses of NPTEL	

5. Add on Courses

The learning process of the students are enhanced with the introduction of add on courses for them. These add on courses also increases the employability skills of the students. Some of the add on courses incorporated are ANSYS, AUTOCAD, CATIA and training in CATIA.

6. Encouragement towards projects with respect to student's interest

Faculty encourages the students to undertake projects taking into account their overall progression. More importance is emphasised on projects with social responsibility. Few projects developed are show cased below.

(i) MINI AGRO TRACTOR

The main objective of this project is to provide a cost efficient tractor to the farming community so that every farmer could afford to have a tractor for harvesting and farming in order to cultivate crops in less time.

The advantages of this tractor are

* Low cost

* Less complexity

* Easy to handle and operate

* Low maintenance cost

* Decent mileage

* Can be used on dry and wet land.

Total cost invested on the project: Rs. 45,000.

(a) By college: Rs.15, 000.

(b) By team members: Rs. 30,000

(ii) DESIGN AND FABRICATION OF SOLAR ELECTRIC VEHICLE

The objective of the project is to have a vehicle functioned by solar power as alternate fuel. The project includes introduction of different high speed and torque gearbox in electric solar vehicles.

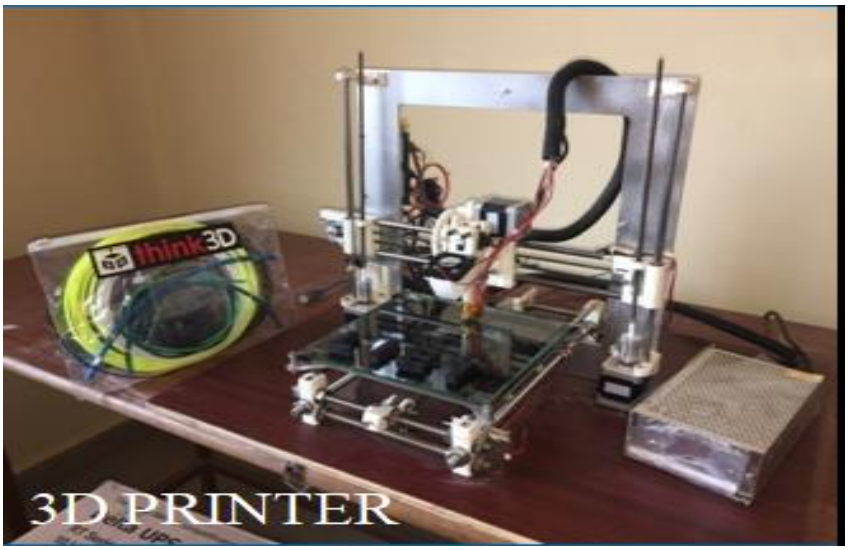
Total cost invested on the project:

(a) By college : Rs. 1,00,000/-

(b) By team members: Rs.2,40,000

(iii) DESIGN AND FABRICATION OF A 3D PRINTING MACHINE

The objective of the project is to have a economical 3D printer, which is used in Additive manufacturing process. Its aim is to help in product design. The steps involved in the project include design of a 3D printer to work on ABS and fabricate the printer. Initial experimentations are successful.



(iv) DESIGN AND FABRICATION OF HUMAN HYBRID VEHICLE

The aim of the project is to promote emission free domestic transport system for public. This project includes the use of different energy resources alternatively for general transportation. This project is provided with two sources of power:

1. Pedalling,
2. Solar charged Battery operated source of power.

(v) FABRICATION OF MULTIPLE OPERATING MACHINE (DRILLING, GRINDING, SAWING)

A model is developed which is capable of performing different operations simultaneously. The operations include drilling, sawing and grinding. This concept of Multiple Operating Machine mainly carried out for production based industries in order to save time assocated with secondary operations.

(vi) DESIGN AND FABRICATION OF ELECTRIC BIKE

The main advantages in this E-BIKE is high efficiency in power train (BLDC MOTOR) ,eco-friendly, high range , noiseless, less weight .Less weight due the body works we used that is GLASS FIBER .The main attractive part of the vehicle is the AERODYNAMIC chassis design. It is planned to install advanced INFOTAINMENT (calling, music, gps navigation, sound sensor), cost effective.

Sl. No	Description	Impact
1	Use of Solar energy in transportation system	A student level club named HV-EV is initiated in the department where 127 students steer its functioning as members.
2	Mini Agro tractor	A startup company is initiated by 5 students of the batch

7. AMENITIES:

Some of the amenities provided in the department are the regular laboratories along with the facilities provided to do research related activities.

- Research and Development Lab.
- Mechanics of Solids Laboratory
- Machine tools lab

Keeping in mind the demands of a few companies in the local region who manufacture products with aluminium, a furnace and a sonicator are procured. The department is in the process of getting some consultancy works in the field of metal matrix materials. The students are also involved in the projects related to metal matrix and composite materials.

Sonicator

RESEARCH AND DEVELOPMENT LAB

Sl. No	Description	Impact
1	R & D Lab	-One paper is published. -Advanced stage of applying for a project to DST (IRRD) with a company based in Visakhapatnam -Four batches of B.Tech projects are being undertaken.
2	Mechanics of Solids Laboratory	-MOU is signed with a company for testing their raw materials. -Good amount of revenue is generated in the Laboratory. -Students from nearby colleges come and use them for testing their work pieces.