1.	Lab Name	**3D Printing Laboratory & Workshop**
2.	In-charge	**Dr. D G Thakur**
3.	Associated Members to the Lab: RAs , PhD Scholars/ Technical Staff	**RA-Nil** **PhD- 01** **Lab officer:Prajith P.** **Lab Assistant: Mr. Bhushan Lokhande**
4.	Contact Details	**02024304195 (Lab. In-charge)**
5.	Infrastructure Specs (H/W, S/W,…)	**Nil**
6.	Area in sq units (optional)	**360 sq.ft.**
7.	Lab Facilities	**1. CNC Turn Mill Centre.** **2. 3D Printer.** **3. Composite 3D Printer.**
8.	Consultancy / Services Offered	**Nil**
9.	Complete & On-going Projects (Details)	**01 (completed)** **02 (Ongoing)**
10.	Collaborations (with DRDO lab, IISER, TATA, TCS, etc)	**NA**
11.	Intellectual Outcome: publications/ patents/ etc..	**Total: 155** **International Journal (SCI and Scopus Indexed): 55** **International Conference: 100**
12.	Mentors Associated: (Like Dr. APJ Abdul Kalam, etc..)	**NA**
13.	Area in sq units (optional)	**NA**
14.	Any other relevant data	**To provides an introduction to precision engineering and manufacturing** **Specific Objectives:** **Develop a practical understanding of basic manufacturing processes.** **Extend basic knowledge to solve manufacturing processes related problems.** **Emphasize the problem solving process and application techniques.** **Analyze data from experiments to performed and reach conclusions.**

3D Printer

Technical Specification:

- Build Volume (L X W X H) - 300 X 300 X 300 mm
- Print Technology - Fused Filament fabrication (FFF)
- Layer Resolution - 50-250 Microns
- Nozzle Diameter - 0.4 – 0.6 mm
- Filament Diameter - 1.75 mm/ up to 10 kg Spool
- Supported Materials - PLA,ABS,HIPS
- Print Speed - More than 100 mm/sec
- Extruder – Two
- Supported operating system - Windows 7 or above
- Connectivity - MicroSD Card, Ethernet, Wi-Fi, USB
- Cost of Equipment - Rs. 502609.00

- Additive manufacturing (AM), colloquially known as 3D printing, is currently being promoted as the spark of a third industrial revolution. It is an emerging and promising technology to create a three dimensional complex geometries object through a layer-by-layer fabrication method. The various technologies used for 3D printing are Stereo lithography, Fused deposition modeling, Selective laser sintering and Multi-jet modeling.
- 3D printing has changed the calculus of manufacturing as it allows one to make customized products without incurring any cost penalties in manufacturing as neither tools nor molds are required. Topological optimization can be achieved as additive manufacturing enables the production of complex and integrated functional designs in one step process by optimizing the part geometry based on design loads

Composite 3D Printer

Technical Specification:

- Process: Continuous Fiber Reinforced Plastics
- Build Volume (LxWxH): 320 x 132 x 154 mm (12.6 x 5.2 x 6 in)
- Weight: 16 Kg (35lbs)
- Machine Footprint: 584x330x355 mm (23x13x14 in)
- Print Bed: Flat to within 160um – Kinematic coupling
- Power: 100-240 VAC, 150W (2A peak)
- Layer Height: 100um default, 200um maximum
- Ultimate Tensile Strength: 700MPa (22.6x ABS, 19.4x Onyx)
- Max Flexural Stiffness: 51 GPa (24.8x ABS, 17.6x Onyx)
- Supplied Software: Markforged Software Plastic Available: Onyx
- Fibers Available: Carbon Fiber, Fiberglass, Kevlar, High Strength/ Temp Fiberglass

- **Description:** The Mark two is very powerful 3D printer. With industrial-scale printing of incredibly strong parts, the Mark Two is destined to be the must-have printer for every manufacturer. This printer combines the benefits of Mark forged unique fiber reinforcement for parts as strong as metal with fine surface finish of Onyx. The Mark Two will empower you to take any design concept and make it a reality.

CNC Turn Mill Centre

Technical Specification:

- Capacity – Swing over Bed – 500 mm
- Chuck Dia – 250 mm
- Spindle Nose – A2 – 6
- Turret – No of Stations – 12
- Tailstock – Quill Dia – 90 mm
- Controller – Siemens
- Accuracy – Positioning – 0.010 mm
- Repeatability – 0.005 mm
- Cost of Equipment - Rs. 3540000.00

- Modern precision machining demands extreme dimensional accuracy and surface finish. Such performance is very difficult to achieve by manual "hand wheel" control machines, even with expert operators. Manufacturing of highly precision components with complex shapes call for a computer-based automatic machine tool controls also known as the Numerical Control (NC) system. Highly automated machines tools such as turn mill centre and machine centre have been developed.
- The advantages of CNC are (1) high accuracy in manufacturing, (2) short production time, (3) greater manufacturing flexibility, (4) simpler fixturing, (5) contour machining (2 to 5-axis machining), (6) reduced human error