Dear Sir/Ma'am,

We are happy to announce to School of the Month Challenge for the months of April – May, 2018. Our partners for the event are KPIT and Stratasys.

The theme for this challenge is leveraging 3D Printing technology to Innovate.

Application are invited across the following focus areas–

1. **Architecture and Design** – Observe various buildings and monuments around you and redesign them so that they could better help suit a Smart City.
2. **Automotive Design** – Redesign various aspects of Automotive parts such as the chassis, engine, battery, headlights etc. to make them better adept to handle the modern day needs of these automotive vehicles.
3. **AgriTech** – Create various tools which can help the agricultural community such as smart plows, new granaries, irrigations pumps/machines etc.
4. **Healthcare** – Make various implants which will help better the life of individuals with regard to the healthcare sector, for example, various hospitals have started 3D printing various implants and organs to ensure that they are more accurate matches for the patients, thereby, ensuring that there is a faster and seemingly painless recovery period for the patients.

We urge you to use the 3D printers available at your ATL to create these projects. It is imperative that the 3D printer is used to create at least 80% of the projects, the other 20% can comprise of other materials.

For the submission of your project please upload a link of the 2 – 3 Minute YouTube video by May 16, 2018. The video should include the following details –

1. Name of School and Student(Team).
2. Why did you choose this focus area?
3. What makes your idea innovative/unique?
4. How will your project benefit society?

Please upload your link + school details on the following link – http://aim.gov.in/school-month/login.php

Winners will get an opportunity to work with our part

Please note that you may only submit 1 project entry per school. We encourage you to organize a showcase within the school to select and judge the projects. Please share videos + images of the event with us via Facebook.

Thank you for your time and enthusiasm. We look forward to seeing your entries!

With Sincere Regards,
ATL Team

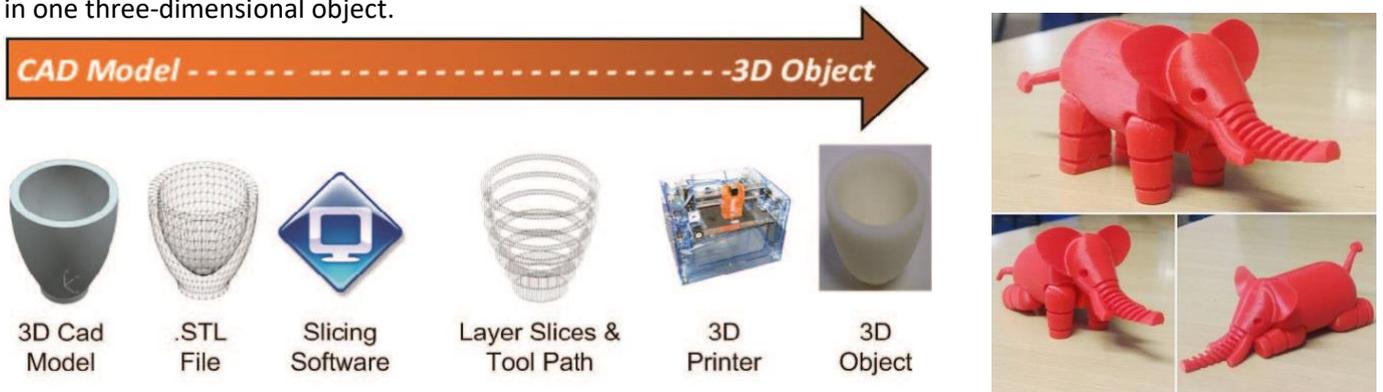(We have enclosed a short 3D printing guide for your consideration)

3D PRINTING

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file.

What is 3D Printing?

The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the entire object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

The process starts with making a virtual design of the object that has to be created. This virtual design is made in a CAD (Computer Aided Design) file using a 3D modelling program (new object) or using a 3D scanner (existing object). Slicing software slices the final model into hundreds or thousands of horizontal layers. When this prepared file is uploaded in the 3D printer, the printer creates the object layer by layer. The 3D printer reads every slice (or 2D image) and proceeds to create the object blending each layer together with no sign of the layering visible, resulting in one three-dimensional object.

CAD Model -3D Object

| 3D Cad Model | .STL File | Slicing Software | Layer Slices & Tool Path | 3D Printer | 3D Object |

Technology used in ATLs : Fused Deposition Modelling (FDM) Technology

FDM can easily be understood as drawing with a very precise hot glue gun, by extruding material through a nozzle to print one cross section of an object (in the X-Y or horizontal plane), then moving up vertically (Z-axis) to repeat the process for a new layer, thus prints from the bottom upwards. The printer nozzle contains resistive heaters that melt the plastic as it flows through the tip and forms the layers. The extruded plastic then hardens immediately as it bonds to the layer below it.

<u>Quality Factors</u>   -   Layer height, material quality, bed level, temp., orientation, nozzle speed, feed rate.

<u>Resolution</u>   -   Range of 75 to 300 microns.

<u>Temperature</u>   -   Range of 170 and 240 degrees Celsius, depending on the type of material being used.

<u>Material</u>   -   Thermoplastics or thermoplastic/organic-material blends. ABS, PLA, polycarbonate (PC), PVA, ninjaflex. For ATLs - PLA has been a clear winner for home 3D printing because of it's biodegradability, and because it does not give off unpleasant chemical fumes during the printing process.

All teachers are:
1. Expected to be aware and translate the following to their audience:
   - Observe Safety norms for using a 3D printer.
   - General maintenance and troubleshooting of a 3D printer.
   - Demonstrate relevant expertise and teach 3D design and slicing software.
2. Suggested to:
   - Choose efficient orientation of the model on print bed.
   - Design and 3D print an object/component with the audience, if time permi
   - Keep the 3D printer on and working during the session for visual explanatio
   - Share 'quick tips', best practices while using the additive manufacturing too...
   - Create samples of a benchmarking model at printed at different parameters and stages.
   - While FDM is a very flexible printing process, it can have trouble printing sharp angles and overhangs.
   - Explain post processing steps like removing rafts and supports, filing, sanding, Acetone vapour bath etc.
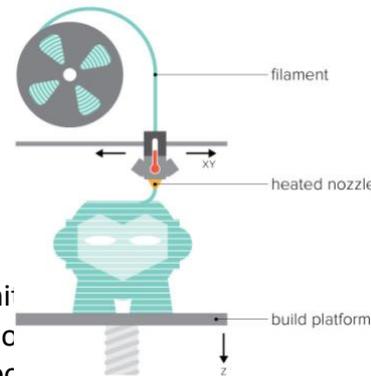
References:

The following is a non-exhaustive and suggestive list of resources on the concept of digital literacy:

Resource Description	
3D Printing – Wikipedia	Link
3D Printing – Youtube Channels	Link
What is 3d Printing	Link
10 best 3D Printing tutorials	Link
Popular 3d modelling design software	Link
List of 3d Modeling software - Wikipedia	Link

Happy Tinkering!